

PROXIMATE DETERMINANTS OF TEENAGE FERTILITY IN ZIMBABWE

BY

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ABSTRACT

Although Zimbabwe is amongst few African countries which have been experiencing a decline in fertility, teenage fertility has not been stable since 1988 to date. This study sought to examine proximate determinants of teenage fertility in order to assess why there was an increase in teenage childbearing in the period 2005 to 2011. Therefore, the study seeks to achieve the following main aims; Describe the trends and levels of teenage fertility in Zimbabwe from the year 1988 to 2011, determine the major determinants of teenage fertility in Zimbabwe and establish the effects of the proximate determinants on teenage childbearing. The examination of the proximate determinants of teenage fertility will be achieved through the use of the Zimbabwe Demographic Health Survey 2010-11.

This study uses the model introduced by Bongaarts (1978; 1982) as its theoretical framework. From Bongaarts (1978, 1982) model, the proximate determinants investigated in this study are marital status, contraception, abortion and age at first sex. In addition, socio-economic variables which are educational attainment, wealth index and geographical variables namely, place of residence (rural and urban) and province are also analysed. These determinants are examined through the use of multiple logistic regression model, Kaplan Meier Survival estimator and Cox Proportional Hazard model. The results obtained from these models show that marital status is the leading proximate determinant contributing to increased teenage fertility. This is followed by contraception usage and age at first sex. The finding that contraception use is positively associated with teenage childbearing contradicts the theoretical framework of this study. This might be attributed to lack of precise data on the timing of contraception use relative to childbearing among teenagers. In congruency with the Bongaarts (1978; 1982) Framework, abortion was found to be an inhibitor of teenage fertility and educational attainment was found to be the main socio-economic variable which is associated with reduced teenage childbearing. Therefore, the research suggests that policies and programs aimed at decreasing fertility during teenage years should be directed towards promoting female education beyond the primary level. In addition, sex education in schools must be made compulsory and restrictions on access to contraceptives by never married teenagers must be removed.

Key words: proximate determinants, teenage fertility, adolescent.

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DECLARATION

I declare that this work is my own unaided work. All borrowed ideas, citations and references have been properly acknowledged. It is being submitted for the degree of Population Studies in the College of Humanities, School of Built Environment and Development Studies, University of Kwa-Zulu Natal, Durban, South Africa. None of the work has been previously submitted for any degree or examination in any other University.

STUDENT SIGNATURE.....

DATE.....

LIST OF ACRONYMS

ZDHS	Zimbabwe Demographic Health Survey
DHS	Demographic Health Survey
CSO	Central Statistics Office
ZRHS	Zimbabwe Reproductive Health Surveys
TFR	Total fertility Rate
WHO	World Health Organisation
ZIMSTAT	Zimbabwe National Statistics Agency
UNFPA	United Nations Population Fund
UNDP	United Nations Development Programme
STIs	Sexually Transmitted Infections
HIV	Human Immunodeficiency Virus
AIDS	Acquired Immunodeficiency Syndrome
YAS	Youth Advisory Services
MDGs	Millennium Development Goals
PPD	Partners in Population and Development
ASFR	Age Specific Fertility rate
US	United States
USAID	United States Agency for International Development
EAs	Enumeration Areas
HSRC	Human and Social Sciences Research
GFR	General Fertility Rate

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CHAPTER 1

1.1. Introduction

Teenage childbearing and the consequences associated with it remain a major concern worldwide. World Health Organisation (2012) reported that, globally, approximately 16 million teenagers aged 15-19 give birth each year. Consequently, it is assumed that rapid population growth which is being experienced worldwide is a result of women giving birth in their teenage years which exposes them to many reproductive years thereby increasing the individual woman's lifetime fertility rates (Senderowitz and Paxman, 1985). Owing to low contraceptive usage among teenagers and early marriages in which the society expects childbearing soon after marriage, postponing childbearing becomes inevitable for married teenagers especially in Zimbabwe. As a result, teenage fertility has been increasing in Zimbabwe. It has been documented that about 95 percent of all births to teenagers occur in developing countries of which Zimbabwe is part of these countries (WHO, 2012). While teenage childbearing is a problem to the society as it contributes to population growth, physical health related consequences to the teenage mother and to the child are more problematic. Physiological immaturity of teenagers make them suffer from labour complications during and after delivery and they usually give birth to low birth weight babies which results in stunted growth and eventually death (Senderowitz, 1995). In addition, teenage childbearing results in teenagers dropping out of school thereby hindering economic opportunities (Kaufmann, Wet and Stadler, 2001). Although research has been conducted on the trends and determinants of fertility in Zimbabwe, relatively little is known regarding determinants of teenage fertility.

This chapter explores the background of teenage childbearing, why teenage fertility is a problem, the rationale and relevance for conducting a study on teenage fertility in Zimbabwe. In this study, the phrases teenage fertility and adolescent fertility are used interchangeably to refer to childbearing occurring among young girls between the ages 15-19 (United Nations, 1987, 1988a, 1989; Garenne, Tollman, Khan, Collins and Ngwenya, 2001).

1.2. Background

A decline in fertility rate by approximately 1.4 births from 5.4 children per woman in 1988 to 3.8 children per woman in 2005 was reported in Zimbabwe (ZIMSTAT and ICF International, 2012). Factors which were attributed to the decline in fertility include increased contraceptive usage, increased educational attainment of women and rising age at marriage

(Manlove, Terry, Gitelson, Papillo & Russell, 2000). Among these factors is excellent administration of family planning programs especially after 1980 which led to high contraceptive usage and significant decline in fertility levels in Zimbabwe (Mashamba and Robson, 2002; Gregson, Zhuwau, Anderson and Chandiwana, 1999). Although fertility has been declining in Zimbabwe in the period 1988 to 2005, an increase in both total fertility and teenage fertility from the period 2005 to 2011 is noticeable. Zimbabwe experienced an increase in fertility rate from 3.8 children per woman in 2005 to 4.1 children per woman in 2011, during the same period, teenage fertility increased from 99 births per 1000 teenage women to 115 births per 1000 teenage women (ZIMSTAT and ICF International, 2012). The factors behind the increase in fertility and teenage fertility during this period have not been documented. The increase in teenage fertility in Zimbabwe from 99 births per 1000 female teenagers in 2005 to 115 births per 1000 female teenagers in 2011 is consistent with the observed teenage fertility trends in sub-Saharan Africa. In the world population report, it was reported that in sub-Saharan Africa, births to teenagers will reach 4.8 million by the year 2020 which is an increase of 400 000 over 1996 levels (Kaufman, Wet and Stadler, 2001; ZIMSTAT and ICF International, 2012; Garenne *et al*, 2001).

Sub-Saharan African countries have high total and teenage fertility rates compared to the rest of the world. The levels of births among 15-19 year olds range from 103 to 209 births per 1000 teenagers in nine out of ten sub-Saharan African countries (Bearinger, Sieving, Ferguson and Sharma, 2007). High birth rate among teenagers might be attributed to political sensitivity regarding fertility control with many family planning service providers primarily focusing on older, married, high parity women for whom services were least controversial (Darabi, Philliber and Rosenfield, 1979). As a result, family planning programs were beneficial to women in the reproductive age group 20-49 and teenagers were deprived of contraception services. In Zimbabwe, many young people become sexually active in their teenage years thereby exposing themselves to high risks of unwanted pregnancy and childbearing. According to WHO (2000), the median age at first sexual intercourse is 18.8 years in Zimbabwe hence it is amongst the countries with high rates of sexually active teenagers. This has been confirmed in a recent study conducted in a rural district in Zimbabwe where it was found that the majority of teenagers, about 60 percent, started indulging in sexual intercourse at the age of 16 (Chemhuru, Matunhu, Shumba and Nyamande, 2011). As such, it is important for family planning providers to focus more on teenagers as they are mostly vulnerable to unwanted pregnancies and childbearing.

In addition to past political sensitivity, it is illegal to provide contraception services to anyone below the age of 16 in Zimbabwe unless parental consent is provided, or they are married (Mashamba and Robson, 2002). As a result of lack of access to contraceptives, teenagers in Zimbabwe are exposed to high risk of unwanted pregnancy and childbearing. This shows that there is high unmet need for family planning services among both married and never married teenagers compared to the other age groups. Furthermore, sexual matters are no longer discussed between parents and children in some societies and cultures in Zimbabwe hence teenagers may rely on wrong information they get from friends. Owing to urbanisation and modernisation, the traditional sex education which was provided by aunts and village elders no longer exist hence teenagers are deprived of important sex education which was provided in the past (Gregson, 1999; Chemhuru *et al*, 2011; Mashamba and Robson, 2002). In order to provide accurate reproductive health information to teenagers, Zimbabwe established specific youth reproductive health centres, for example, Bulawayo Youth Advisory Council and Youth Advisory Services. Youth Advisory Councils embarked on contraceptive awareness programs but the services remained under-utilised by adolescents because they were mainly situated in urban areas and failed to serve rural areas where the majority of teenagers reside.

Zimbabwe is amongst the countries in Southern Africa with high reproductive ill-health indices among its adolescents. Teenagers are increasingly recognised as a marginalised social group in terms of access to reproductive health services and are also neglected by policy makers (Mashamba and Robson, 2002). According to WHO (2000) and UNFPA (2000b) reproductive health is a basic human right. A country is said to have excellent reproductive health services when people of all ages have the freedom to choose when to have children, have the right to information and access to safe, accessible, affordable and acceptable methods of fertility regulation they deem necessary (WHO, 2000). Owing to poor reproductive health services specifically for teenagers in Zimbabwe, it has been reported that many teenagers wanted to postpone 40 percent of their births and unwanted births were about 70 percent of overall teenage births in the 1990s (Government of Zimbabwe, 1994). As a result, early pregnancy, childbearing and contraction of STIs and HIV/AIDS are signs of poor reproductive health services in Zimbabwe. UNDP (1999) cited in Mashamba and Robson (2002) indicates that adolescent fertility in Zimbabwe is high contributing about 14.5 percent to total fertility. The Government of Zimbabwe (1994) reported that approximately 20 percent of teenagers are either mothers or expecting their first child, with 22 percent teenage mothers found in rural areas 22 compared to 15 percent in urban areas. In addition, high rates

of teenage mothers were found among teenagers with primary education 28 percent compared to those with secondary education 13 percent (Mashamba and Robson, 2002). Owing to stigma which is attached to early sexual activity, early childbearing and abortion, it is assumed that teenage fertility might be higher in Zimbabwe than what is recorded (Gregson *et al*, 1999; Chemhuru *et al*, 2011).

Focusing on Africa, teenage fertility in Zimbabwe, South Africa and Kenya was reported to have been declining, however; the rates are still very high compared to international standards (Thomas and Muvandi, 1994). As such, the government and health professionals need to be aware of the determinants that affect teenage fertility in order to channel resources towards those factors and to develop best strategies to reduce teenage fertility further.

1.3. Problem statement

Although fertility rates have been declining in Zimbabwe, an increase in births to teenage girls remains a major problem (Kirk and Pillet, 1998). It has been reported that, in Zimbabwe, approximately 20 percent of teenagers have given birth more than once in the 1990s (Government of Zimbabwe, 1994). Previous research has shown that teenage fertility is high in sub-Saharan Africa compared to other parts of the world. The levels of births among 15-19 year olds range from 103 to 209 births per 1000 teenagers in nine out of ten sub-Saharan African countries (Bearinger *et al*, 2007). In the recent world population report it has been indicated that the number of births to teenagers in sub-Saharan Africa is estimated to increase to about 4.8 million births to girls aged 15-19 in the period 1995 to 2020 (McDevitt *et al*, 1996). The increase in births which is estimated to be about 400, 000 more than 1996 levels mirrors a growth in the number of teenagers and higher levels of teenage fertility in sub-Saharan Africa (McDevitt *et al*, 1996, Kaufman *et al*, 2001). The results from the recent Demographic Health Survey (DHS) conducted in Zimbabwe are in line with the world population report as it has been shown that births to teenagers increased from 99 births per 1000 teenage females in 2005 to 115 births per 1000 teenage females ZIMSTAT and ICF International, 2012).

It has been reported that population growth which is experienced worldwide is a result of women giving birth during their teenage years which exposes them to many reproductive years (Senderowitz and Paxman, 1985). Similarly, UNDP (1999) cited in Mashamba and Robson (2002) indicates that adolescent fertility in Zimbabwe is high contributing about 14.5 percent to total fertility. Given that Zimbabwe is undergoing an economic crisis in which

almost all sectors of the economy have been affected negatively, high teenage fertility would mean that the available resources in the country will not be enough to meet the population's demands hence the call for the government to reduce teenage fertility further (CSO, 1989; 2007). Literature has shown that teenage childbearing has so many adverse consequences which retard the growth of the economy. Teenage childbearing is associated with high maternal and infant mortality which calls for the government to focus and spend more on number four and five of the Millennium Development goals (MDGs), which are; to reduce child mortality rates and to improve maternal health. In addition, teenage pregnancy and childbearing in Zimbabwe is associated with high school dropout making it difficult for teenage mothers to have better economic opportunities thereby increasing the dependency ratio and number of economically inactive people in the country (Kaufman *et al*, 2001). Since teenage fertility is contributing significantly to total fertility and population growth, in order to tackle the consequences associated with it, it is vital to investigate the main proximate determinants which were behind teenage childbearing in Zimbabwe in the period 2005 to 2011.

1.4. Rationale of the study

The rationale of this study is to understand the determinants that influence teenage fertility such that policy makers can formulate policies which are directed towards reducing teenage fertility and the consequences which are associated with teenage childbearing. The study focuses mainly on teenagers because they form the largest part of the total population in Zimbabwe as indicated by a broad based population pyramid, hence early childbearing during teenage years increase total fertility and ultimately contributes largely to population growth. In addition, teenagers are mainly neglected in the provision of family planning programs and Zimbabwe is one of the countries with high unmet contraception needs for teenagers (Partners in Population and Development (PPD), 2013). As a result, many teenagers are exposed to high risk of unwanted pregnancy, early childbearing and high maternal mortality among teenagers.

Given that teenage fertility is a problem in many countries and Zimbabwe is no exception, there is need to identify and understand the proximate determinants of teenage fertility such that corrective measures can be taken to reduce teenage fertility.

1.5. Objectives of the study

The research objectives of the study are to:

- Provide a description of the trends and levels of teenage fertility in Zimbabwe for the period 1988 to 2011.
- Identify the proximate determinants of teenage fertility in Zimbabwe in the period 2005-2011.
- Investigate the effects of proximate determinants of fertility on teenage fertility in Zimbabwe.

1.6. Relevance of the study

This study is relevant in contributing to an understanding of proximate determinants of teenage fertility in Zimbabwe through the use of 2010-11 ZDHS. In addition, after identifying the main proximate determinants of teenage fertility in Zimbabwe, health professionals and policy makers will use the information to channel relevant resources towards the determinants to reduce teenage fertility and unmet needs of adolescents in Zimbabwe. Having noticed that there is no literature on the proximate determinants of teenage fertility in Zimbabwe as many studies focused on the health consequences and school outcomes, this study contributes greatly to the existing literature on teenage sexual behaviour, consequences of early childbearing and mainly on proximate determinants of teenage fertility.

1.7. Organisation of the dissertation

This study is organised into six chapters. The first chapter is comprised of the background, problem statement, rationale and the relevance of studying teenage fertility in Zimbabwe. The second chapter reviews literature on the levels, trends and determinants of fertility and particularly teenage fertility. The third chapter discusses the theoretical and conceptual framework used in this study to understand the determinants of teenage childbearing in Zimbabwe. It further describes the type of data and methodology used to investigate and analyse teenage childbearing in Zimbabwe. The presentation of the results on determinants of teenage childbearing and age at first birth is done in chapters four and five respectively. Chapter six provides a discussion of the main findings from statistical analysis of ZDHS 2010-11, recommendations and a conclusion of the study.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

This chapter reviews literature partly on the proximate determinants of fertility. It mainly reviews evidence from previous studies on what has been found to be the proximate determinants of teenage fertility in developed and developing countries worldwide. The main proximate determinants of teenage fertility to be reviewed are age at first sexual intercourse, age at first birth, marital status, contraception and abortion. In addition, literature has shown the importance of socio-economic factors which work indirectly through the proximate determinants of fertility to inhibit teenage fertility. Literature on socio-economic factors which are religion, place of residence, educational attainment and family structure is also reviewed.

2.2. Fertility

Bongaarts (1978) postulates that fertility variations among populations and its trends over time can always be traced to differences in one or more of the intermediate fertility variables. Bongaarts (1982) further posits that while fertility variations can be traced to one or more intermediate variables, the extent of the variation differs among variables as does their degree of influence in different societies over time and within societies. Owing to different intermediate variables, fertility has been declining in several countries in Southern and Eastern Africa namely Kenya, Zimbabwe, Botswana, Tanzania and South Africa (Robinson, 1992; Brass and Jolly, 1993; Rutenberg and Diamond, 1993; Hinde and Mturi, 2000; Caldwell and Caldwell, 1993). As such, it is crucial to have an understanding of the intermediate fertility variables which are behind teenage fertility levels and rates in Zimbabwe.

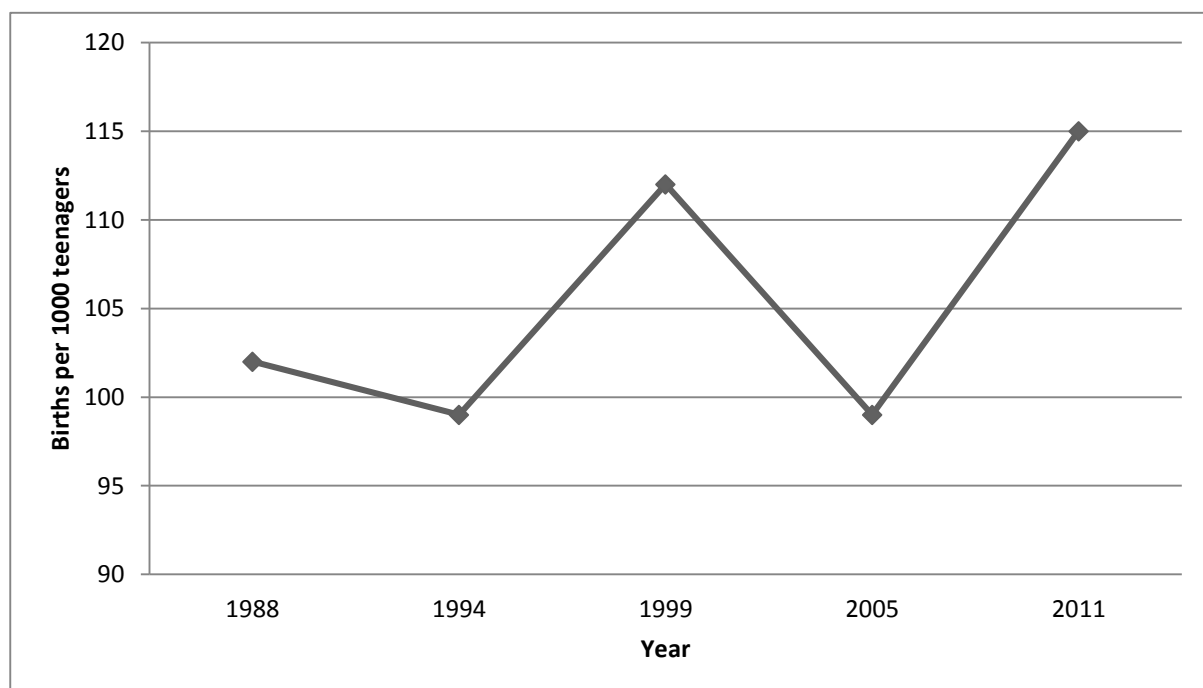
2.2.1. Levels and trends of fertility and teenage fertility in Zimbabwe

In 1984, surveys conducted under the Zimbabwe Reproductive Health Survey (ZRHS) showed that Total Fertility Rate (TFR) for women aged 15-49 was 6.5 births per woman (Mturi and Joshua, 2011). TFR declined to 5.5 births per woman as indicated in a survey conducted by the 1988 ZDHS. In 1994, TFR was recorded at 4.3 births per woman and it slightly declined to 4.0 and thereafter it sharply decreased to 2.7 births per woman in 2006, representing a fertility decline of about 41.5 percent (ZIMSTAT and ICF International, 2012). Sibanda (1999) conducted a study on the role of proximate determinants in Zimbabwe and Kenya through the use of 1988, 1989 and 1994 Demographic Health Surveys. In the

study, Sibanda (1999) found that fertility inhibiting effects of contraception were greater compared to postpartum infecundability, marriage patterns and sterility. These results also reinforce Brass and Jolly (1993) findings of declining fertility in Zimbabwe owing to high contraceptive usage.

Figure 2.1 below shows trends of teenage fertility from the period 1988 to 2011. It is shown that in 1988, births to teenagers aged 15-19 were 102 per 1000 teenagers and the number slightly decreased to 99 births per 1000 teenagers in 1994 (ZIMSTAT and ICF International, 2012). A sharp increase from 99 births per 1000 teenagers to 112 births per 1000 teenagers was recorded from the period 1994 to 1999 and births significantly dropped by the same rate to 99 births per 1000 teenagers in 2005-06 (ZIMSTAT and ICF International, 2012). In Figure 2.1 below, it is presented that, from the period 2005 to 2011 a sharp rise in births were reported at 115 births per 1000 teenagers. Of importance is that the reasons behind teenage fertility rates in Zimbabwe have not been documented. Therefore, it is crucial to understand the determinants which are behind teenage childbearing in Zimbabwe in order to take corrective measures which inhibit teenage fertility.

Figure 2.1: Trends in teenage fertility rates in Zimbabwe, 1988-2011



Source: (ZIMSTAT and ICF International, 2012)

2.2.2. Levels and trends of teenage fertility outside Africa

Most of the Western countries examined by Westoff, Calot and Foster (1983) had a low to moderate levels of adolescent fertility in the early 1970s and in most of these countries the decline in teenage fertility was slightly greater than the decline in total fertility. As a result, the proportion of fertility attributable to teenagers in western countries declined. In contrast, Eastern and Southern European countries particularly Czechoslovakia, Hungary, Greece, Portugal and Spain experienced an increase in teenage fertility in the 1970s; hence, teenage proportion of total fertility increased leading to a rise in total fertility in these countries (Westoff *et al*, 1983). Japan is the only country with teenagers having a very low fertility rate of approximately 17 births per 1000 teenage females thereby constituting one percent of total fertility. Similarly, Singh and Darroch (2000) in their study on adolescent pregnancy and childbearing levels and trends in developed countries, they found that Japan and most Western European countries have very low pregnancy rates which are below 40 per 1000 adolescents. A lag in falling teenage birth rates was noticed in some South Asian countries which were characterised by highest traditional rates of adolescent marriage, as a result, birth rates only started falling in the mid-1970s (Singh and Darroch, 2000). Teenage birth rates have been falling in Central Asia with an average teenage birth rate of approximately 59 births per 1000 teenagers ranging from the lowest of 27.7 births per 1000 teenagers in Azerbaijan to the highest of 152 births per 1000 teenagers in Afghanistan (Bearinger *et al*, 2007). The average teenage birth rate is quite low at 56 births per 1000 teenagers in East and South Asia and the Pacific, varying from 3.6 births per 1000 teenagers in China to 115 births per 1000 teenagers in Bangladesh (Bearinger *et al*, 2007). Latin America has the highest average teenage birth rate of approximately 78 births per 1000 teenagers varying from 48.3 births per 1000 teenagers in Cuba to 149 births per 1000 teenagers in Nicaragua. The lowest rates were observed in Europe where the average birth rate is about 25 births per 1000 teenagers varying from 5.4 births per 1000 teenagers in Switzerland to 40.4 births per 1000 teenagers in Bulgaria (Bearinger *et al*, 2007).

Of importance is the difference between teenage fertility rate in Canada and United States given that the countries are close to each other and their cultural practices are similar. Canada has the lowest teenage pregnancy of 32.1 pregnancies per 1000 teenagers and births of 14.4 per 1000 teenagers while United States of America has the highest rates of adolescent pregnancy of 75.4 pregnancies per 1000 adolescents and births of 41.1 per 1000 teenagers (Bearinger *et al*, 2007). Similar results were found by Friede, Hogur, Doyle, Hammerslough,

Snizek and Arrighi (1986) who observed that more than 89 000 children were born to women aged 16 and below in the US. In 1980, US TFR for teenagers aged 14 to 17 was found to be 101 births per 1000 women which became the second highest among 32 developed countries with Hungary being the highest at 102 births per 1000 teenagers and Japan the lowest at 2 births per 1000 teenagers (Friede *et al*, 1986). Pillai (1988) cited Echolm (1977) who postulates that teenage females worldwide have high risk of getting pregnant and their contribution to total fertility is significant as evidenced by teenage births which contribute about 10 to 15 percent to total births.

Teenage fertility is considerably higher in the United States although it has been reported to be declining compared to other developed countries (Westoff *et al*, 1983). This might be related to hardships faced by teenagers in accessing clinics in the United States as it was documented that, compared to other developed countries; United States clinics were not easily accessible. As such, it was found that teenage pregnancy was lower in countries where there was greater availability of contraceptive services and sex education (Jones, Forrest, Goldman, Henshaw, Lincoln, Rossoff, Westoff and Wulf, 1985). In a study conducted by Jones *et al* (1985) on teenage pregnancy, determinants and policy in 37 developed countries, an important observation was made regarding the relationship between teenage sexual activity and pregnancy. It was observed that differences in the levels of sexual activity among teenagers could not explain the differences in teenage pregnancy and childbearing. This has been evidenced in Netherlands and Sweden where it was clearly indicated that postponement of first intercourse was not a requirement for avoiding early pregnancy (Jones *et al*, 1985).

2.3. Teenage fertility in developing countries

In a study on social interactions and contemporary fertility transition, Bongaarts and Watkins (1996) cited United Nations (1995) which reported that rapid fertility transitions have been observed in many developing countries. In the 1970s, teenagers constituted about 20 to 25 percent of the total population of developing countries (Darabi *et al*, 1979). Globally, it has been indicated that more than 1.5 billion people are under the age of 25 (Alli, Maharaj and Vawda, 2013). Between the early 1960s and late (1985-90) total fertility rate of the developing world as a whole declined by approximately 36 percent that is from 6.0 to 3.8 births per woman (United Nations, 1995). Although teenage fertility rates in developing countries are declining, the rates remain extremely high relative to those in the developed countries. Age specific live birth rates for women aged 15 to 19 varied from 21.0 per 1000 in

Cyprus in 1975 to 187.8 per 1000 in Liberia in 1971 (Pillai, 1988). Looking at age specific marriage rate for teenagers, it varied from 26.4 per 1000 in Panama to 86.9 per 1000 in Jordan in the year 1970.

In a study on teenage fertility in developing countries, Pillai (1988) compiled Age-Specific Fertility Rates (ASFR) for developing countries and found that in 1960, the Asian teenage fertility rate range was higher than that of Africa, Latin America and Oceania. However, looking at all developing countries it was highlighted that in 1960 the average number of births per 1000 teenagers was 116 which decreased to 106 births per 1000 teenagers in 1965 (Pillai, 1988). The coefficient variation of the number of births per 1000 teenage females was 47 percent in 1960 and about 44 percent in 1965. In all developing countries, the median number of births per 1000 teenagers was reported to be 112 in 1960 and it decreased to 108 births per 1000 teenagers in 1965 (Senderowitz and Paxman, 1985). Compared to developed countries, the regions of Asia, Africa and Latin America had teenage fertility rates of more than 100 births per 1000 teenage females in 1960 and the largest proportion of approximately 38 percent was observed in Latin America. All these differences in teenage fertility rate mirrored cultural, economic and social diversity which characterise developing countries. In addition, high rates of teenage fertility in developing countries have been attributed to unfriendly services provided to the youth by health professionals. This has been reinforced by Ali *et al* (2013) who observed that the provision of youth friendly services is a relatively recent practice in developing countries.

2.4. Regional variations in teenage fertility

A study conducted by Kosunen, Vikat, Gissler and Rimpela, (2002) on the trends and regional variation in teenage pregnancy, abortion and fertility rates found that there were remarkable regional differences in teenage fertility rates in Finland. Rapid teenage fertility decline was reported in Finland where teenage pregnancy and abortion rates declined by more than half from 1970s to early 1990s and this was the lowest in the Nordic countries in 1996 (Kosunen *et al*, 2002). Highest teenage fertility rates were reported in remote areas of the country and from the 1970s till 1990s these regional differences remained the same although significant decreases in the incident of teenage pregnancies were recorded in the country. Highest rates in remote areas are attributed to less effective use of contraceptives among teenagers and reduction of sex education in schools. This is similar to what this

research seeks to explore, that is, if there are any geographical differences in teenage fertility in Zimbabwe.

2.5. Teenage fertility in Africa

In many African countries fertility has been declining despite an increase in teenage premarital fertility which has been noted in several studies (Lesthaeghe and Jolly, 1995; Gage, 1998; Bledsoe and Cohen, 1993). Fertility decline has been documented in some parts of sub-Saharan Africa especially in countries like Kenya, Zimbabwe, Botswana, Tanzania and South Africa (Robinson, 1992; Brass and Jolly, 1993; Rutenberg and Diamond, 1993; Hinde and Mturi, 2000; Caldwell and Caldwell, 1993). Cohen (1998) contends that the decline in fertility noticed in these countries is attributed to greater use of modern contraception and rising age at marriage. Although total fertility has been declining, an increase in premarital fertility has been reported in many countries (Lesthaeghe and Jolly, 1995; Bledsoe and Cohen, 1993; Gage, 1998). This has been supported by McDevitt, Adlakha, Fowler and Bourne (1996) who observed that teenage fertility in sub-Saharan Africa continues to be higher compared to other regions. In 16 out of 22 sub-Saharan African countries, teenage fertility rates were over 150 births per 1000 women in the mid-1970s to early 1980s and from 1980s to 1990s, adolescent age specific fertility rates declined at a moderate rate (McDevitt *et al*, 1996).

In sub-Saharan Africa, teenagers constitute a large portion of the population. According to the United Nations (1991) cited in Bledsoe and Cohen (1993) there were about 46 million 15 to 19 year olds in sub-Saharan Africa in the year 1985 and the figure was projected to sharply rise to reach 106 million by 2010 indicating an annual growth rate of 3.3 percent. As such, Senderowitz and Paxman (1985) assert that the proportion of teenage mothers increased in many African countries. Similar to these findings, Mcdevitt *et al* (1996) conducted a study on the trends in adolescent fertility and contraceptive use in developing countries. From the study it was projected that teenage births will increase by 23 percent in sub-Saharan Africa from 1995 to 2020. This was attributed to high voluntary sexual activity by the majority of teenagers in sub-Saharan Africa as indicated by approximately 75 percent of females having had at least one sexual intercourse by the age of 20 (Blum, 2007 cited in Prata, Weider and Sreenivas, 2012).

In addition, Bearinger *et al* (2007) indicate that in many sub-Saharan countries one in five adolescent girls give birth each year and the majority of adolescent girls are more likely to

have a child by the age of 20. This was epitomised by high teenage birth rate in Cameroon of 297 births per 1000 teenagers in 1965. As a result, teenage fertility rates in sub-Saharan Africa were high as compared to worldwide average of 65 (McDevitt *et al*, 1996). This was due to extreme variations in average birth rates per 1000 teenagers varying from 37 in Mauritius to 229 in Guinea which yields an average birth rate of 143 births per 1000 teenagers in sub-Saharan Africa (Bearinger *et al*, (2007). Although teenage fertility is a well-known problem in sub-Saharan Africa, a trend towards lower fertility was recognised from the mid-1970s to early 1990s, especially in Kenya and Senegal where the decline was so significant.

Moultrie and McGrath (2007) showed that in South Africa, teenage fertility increased from 83 births per 1000 teenagers in 1990 to 101 births per 1000 teenagers in 1992. Similarly, in Botswana the percentage of women aged 15-19 with children rose from 15 percent in 1971 to 24 percent in 1988 (Republic of Botswana, 1989 cited in Boohene, Tsodzai, Hardee-Cleaverland, Weir and Johowitz, 1991). In north-eastern Brazil, Gupta and Leite (1999) through the use of 1986, 1991 and 1996 Brazil DHS surveys looked at adolescent behaviour, trends and determinants. They found that the contribution of adolescent fertility to total fertility was increasing over time especially in the north-east region of Brazil even though total fertility decline was observed among women in the middle of their reproductive years. Gupta and Leite (1999) showed that births among adolescent women in Brazil increased from 12 percent to about 19 percent leading to an increase in the contribution to total fertility from 12 percent to 20 percent while the rate among women aged 25-39 decreased from 53 percent to approximately 48 percent between 1986 and 1996.

Premarital births among teenagers have been increasing in some African countries. In South Africa non-marital teenage fertility was reported to be high particularly in KwaZulu-Natal province due to high prevalence of teenage pregnancy (Preston-White, 1990; Preston-White 1988 cited in Nzimande, 2006). Building on Preston-Whyte (1990), Garenne, Tollman and Khan (2000) assert that high prevalence of adolescent fertility has a strong impact on age specific fertility rates and the shape of the fertility schedule. This is the case in South Africa where premarital fertility is high at the ages 15-19 accounting for almost all births of about 82 percent thereby exceeding marital fertility in the age group 20-24 which is 39 percent (Garenne *et al*, 2000; Alexander and Guyer, 1993). Similar to South Africa, an increase in premarital births was reported, with highest births reported in Namibia (56) followed by

Kenya (32) then Zimbabwe (24) and the lowest were recorded in Malawi (13) (Harwood-Lejeune, 2001).

2.6. Proximate determinants of teenage fertility

2.6.1. Age at first sex

In the modern day, sexual initiation occurs outside marriage and mainly results in unwanted pregnancy and childbearing. In a study conducted in Ekiti by Caldwell, Orubuyoye and Caldwell (1992) it was demonstrated that many teenagers about four-fifths in urban areas and two-thirds in rural areas engaged in sexual intercourse before marriage. Similar to these findings, Camlin, Garenne and Moultrie (2004) document that in rural areas of Kwa-Zulu Natal province, the majority of teenagers were sexually active (60 percent). The findings are also confirmed in Cameroon and Cote d’voire where approximately 70 percent of adolescents reported being sexually active (Meekers, 1994). In addition, Meekers (1994) reports that in African countries levels of sexual experience among unmarried teenagers varies from 13 percent in Mali, 20 percent in Burundi, 48 percent Zimbabwe, 59 percent Liberia, 60 percent in Ghana, 61 percent in Kenya and 65 percent in Togo. Early sexual initiation exposes teenagers to high risk of unwanted pregnancy, childbearing and contraction of STDs and HIV/AIDS.

In a study conducted in Harare, Zimbabwe by Boohene *et al*, (1991) it was found that sexual intercourse was initiated before marriage but most adolescent childbearing took place within marriage. As a result, through the use of 1994 ZDHS, it was found that premarital fertility was declining in Zimbabwe (Harwood-Lejeune, 2001). The decline in premarital fertility according to Blank and Way (1998) was attributed to low proportions of teenagers reporting having had sex in Zimbabwe. In contrast to Blanc and Way (1998) findings, it has been noted that premarital sexual activity and the number of unintended adolescent pregnancies are increasing even though the tradition and culture in Zimbabwe only approves adolescents to have children within marriage (Boohene *et al*, 1991). Early sexual initiation among teenagers was pinpointed as one of the factors contributing more to unwanted pregnancy and childbearing (Garenne *et al*, 2000).

2.6.2. Age at marriage and birth

Age at marriage and first birth are vital determinants of teenage fertility because they determine the number of years that a woman will be exposed to childbearing. Marriage in

many countries marks the official onset of sexual intercourse and exposure to childbearing hence it is very crucial to consider the age at which people marry and give birth as it plays an important role in analysing fertility. As such, age at marriage and is a critical determinant of exposure to childbearing although a significant proportion of women now have children before their first marriage (Garenne, 2004). Cohen (1998) postulates that fertility and teenage fertility decline in Africa is attributed to later age at marriage and delayed first birth. Harwood-Lejeune (2001) confirms these findings in the study on rising age at marriage and fertility in Southern and Eastern Africa where it was found that about one sixth to one third of fertility decline was a result of rising age at marriage. Therefore, it was deduced that rising age at first marriage and postponement of childbearing are the factors behind fertility decline in seven countries namely Namibia, Malawi, Zambia, Zimbabwe, Kenya, Tanzania and Uganda (Harwood-Lejeune, 2001). On a similar notion, Moultrie and McGrath (2007) indicate that a decrease in teenage fertility in South Africa from 83 births per 1000 teenagers in 2001 to 73 births per 1000 teenagers in 2005 is attributed to late age at marriage (Makiwane, 1998).

Results from the 1984 ZRHS showed that one third of Zimbabwean women had their first child before the age of 18 (Adamchak and Mbizvo, 1990; Mashamba and Robson, 2002; Thomas and Maluccio, 1995). As such, births to teenagers constitute a large proportion of all births in Zimbabwe because the gap between age at marriage and age at first give birth in marriage is very small. The median age at first marriage varies from under 18 years in Malawi, Mozambique, and Uganda to above 19 years in Zimbabwe and Kenya (Harwood-Lejeune, 2001). According to the ZDHS, the median age at first marriage among women was 19.7 in 2011, which was one of the highest among African countries and the median age at first sexual intercourse was 18.9 years (ZIMSTAT and ICF International, 2012). Similarly, Rosero-Bixby (1996) shows that late age at marriage in Latin America and East Asia resulted in moderate levels of fertility before the European transition. This is also evident in a research conducted by Mauldin and Berelson (1978) cited in Rosero-Bixby (1996) where it was found that delayed marriages accounted for about 35 to 40 percent birth reductions in ten developing countries experiencing major fertility declines. In Asia and near East and North Africa, largest declines of teenage fertility owing to rising age at marriage were also recorded (McDevitt *et al*, 1996). Kirk and Pillet (1998) postulate that age at marriage and age at first birth are lowest in countries with no evidence of fertility decline and highest in countries with significant fertility decline for example Kenya and Zimbabwe. Despite higher age at marriage

and a higher age at first birth found in Kenya and Zimbabwe in the 1990s, the interval between the two was very small and resulted in high premarital births which were mainly teenage births.

McDevitt *et al* (1996) found that delayed age at marriage and first birth directly affects total fertility by reducing the number of years available for childbearing. However, it is stated that rising age at first marriage affects post-marital component of fertility whereas the premarital which is usually teenage fertility remains unaffected (McDevitt *et al*, 1996). This decline in the post-marital component of fertility is behind the decline in fertility hence the premarital component which constitutes the majority of teenage females becomes an increasing part of total fertility in most African countries. In contrast, Harwood-Lejeune (2001) shows that trends towards lower adolescent premarital fertility are found but further research is needed to determine the reasons or factors behind adolescent fertility decline. Historically, women used to marry young and this has changed over time. In the modern era, women are now postponing marriage due to various reasons for example educational attainment. However, postponement of marriage does not stop them from having children whilst they are not married. As such it is argued that teenagers can start childbearing outside marriage which leads to high premarital births such that late age at marriage in some instances does not reduce fertility levels. As a result, this study attempts to determine the main proximate determinants which are behind teenage fertility in Zimbabwe.

2.6.3. Marital status

It is crucial to know the distribution of teenage girls by marital status because once a woman is married the African society expects her to have a child soon after that. Generally, in all societies, teenage girls, married or not once they have a child contributes to total fertility. It is crucial then to know the marital status of the teenage girls so as to determine their marital status contribution to total fertility. Swartz (2002) postulates that in many populations, married women have higher children than unmarried women of the same age hence fertility is directly related to marriage. Many teenagers in sub-Saharan Africa become sexually active before they turn 19 years and teenagers who become pregnant end up getting married (WHO, 2006; Blanc and Way, 1998). This increases the risk of childbearing, STDs, HIV/AIDS and teenage fertility because women, who marry early, on average, will have longer exposure to pregnancy and greater number of lifetime births. In 15 out of 18 countries studied in sub-Saharan Africa, more than 20 percent of females aged 15 -19 were reported as ever married

and about 40 percent of adolescent women were married in seven sub-Saharan countries (Blanc and Way, 1998). According to WHO (2006) about 20 percent or more of teenagers are married by the age of 18 in countries like Zimbabwe, Brazil, Haiti and Egypt and lower proportions of ever married adolescents were documented in Namibia and Rwanda.

A large proportion of all births in Africa have been from adolescent females mainly because adolescent marriages and childbearing outside marriage is not only quite normal but highly desired in many parts of Africa. It was observed that in two thirds of sub-Saharan African countries at least 1 out of 4 of women aged 15-19 were married and this was because marriage during adolescent years was greatly supported in Africa and Asia (McDevitt *et al*, 1996). It is estimated by McDevitt *et al* (1996) that in sub-Saharan Africa, approximately one million more births will occur each year to both married and unmarried teenage mothers in the period 1995 to 2020. According to the Department of Health (1999b) in South Africa, about 3 percent of women below the age of 20 are married or live with a partner and 35 percent have been pregnant or have a child. Recently, the most significant change reported by the National Research Council has been the rise in childbearing among adolescent women who are not married in sub-Saharan Africa (Garenne *et al*, 2001). This is reinforced by Bledsoe and Cohen (1993) who argue that, the most significant change in sub-Saharan Africa is not an increase in total rates of adolescent fertility but in childbearing among adolescents who are not married. This is supported by Harwood-Lejeune (2001) who found that although the proportion of never married women rose in Zambia and Madagascar, premarital fertility remains very high leading to a rise in the premarital component of adolescent fertility. Furthermore, Rosero-Bixby (1996) after analysing four population census data from 1950 to early 1980s found significant reductions in teenage fertility in eight Latin American countries owing to changes in the proportion of teenagers in union in the 1960s. Given that in many African countries adolescent fertility is significantly contributing to total fertility one would want to know if Zimbabwe is experiencing the same pattern. In addition, it will be interesting to find out whether Zimbabwe is experiencing similar results found by Rosero-Bixby (1996) of declining fertility due to changes in proportion of teenagers in union or will the results of this study be similar to Zambia and Madagascar where adolescent fertility was found to be increasing regardless of rising proportions of never married women (Harwood-Lejeune, 2001).

2.6.4. Contraception

Contraception according to Bongaarts, Frank and Lesthaeghe (1984) is the deliberate parity dependent practice which is undertaken to reduce the risk of conception. The main crucial challenge facing sub-Saharan African countries is to address and meet the needs of adolescent females as they initiate sexual intercourse and are exposed to the risk of pregnancy. Owing to high unmet teenage contraception needs, the increase in teenage fertility according to Bongaarts and Bruce (1995) is attributed to inaccessibility of contraceptives and lack of knowledge and fear of contraceptive side effects by teenage women. On a similar line of reasoning, Maharaj (2001) argues that contraceptive use among adolescent girls remains very low thereby increasing the risk of unplanned and unwanted pregnancy as well as exposing teenagers to various STDs. This has also been supported by Prata *et al* (2012) cited in Bearinger *et al* (2007) who postulate that youth family planning programs in sub-Saharan Africa have not been given enough emphasis in the last decade. As a result, high unmet needs for family planning services especially for teenage females are correlated with high fertility. Similarly, it was reported that family planning needs of the youth were 2.3 times higher than those of the adult population (Manzini, 2001; Hofferth, 1987). Furthermore, Ali *et al* (2013) argue that although health clinics have the capacity to include youth reproductive services, studies have shown that youths do not utilise the services due to health workers negative attitude which discourage them from seeking family planning services.

Focusing on income, education, percentage married, percentage Black, abortion ratio and contraception ratio as variables, Brann (1979) studied variations in teenage fertility rates in 50 countries. The study found that the decline in teenage birth rate in the early 1970s was attributed to availability of contraceptives to teenagers and legal abortions in some countries. Between 1970 and 1974, Brann, (1979) indicates that countries with high contraceptive availability experienced a rapid decline in teenage fertility. Letamo and Letamo (2001) conducted a comparative study of Botswana, Zambia and Zimbabwe on the role of proximate determinants in fertility transition and found that even though breast feeding was the major inhibiting factor in these three countries, modern contraception appeared to be the major inhibiting factor responsible for fertility decline. Zambia stood out with traditional methods of contraception constituting about 15 percent of fertility decline (Letamo and Letamo, 2001).

Bender, Geirsson and Kosunen (2003) looked at the trends in teenage fertility, abortion and pregnancy in Iceland and Nordic countries from the period 1976 to 1999. In the study,

Iceland was found to have higher teenage pregnancy rate compared to Nordic countries. The difference in teenage pregnancy rates in these countries was attributed to cultural norms in Iceland's society which consider sex education, delivery and use of contraceptive methods as a taboo. On the other hand, a study conducted in Estonia by Haldre, Karro, Rahu and Tellmann (2005) found that the availability of contraceptives, enough information regarding accessibility and use of contraception and professional service which was not sensitive to teenagers reduced teenage childbearing in the country. In Estonia availability of these factors led to a rapid decrease in teenage birth rate by more than a half from 49.7 births per 1000 teenagers in 1992 to 23.8 births per 1000 teenagers in 2001 (Haldre *et al*, 2005).

Similar to the findings in Estonia, Westoff *et al* (1983) in their study on teenage fertility in 30 developed countries found that a decline in teenage fertility in the western and northern Europe was due to increasing reliance on contraceptives, a decline in the proportion of teenagers who were married, and increasing rates of abortion. Santelli and Melnikas (2010) in their recent study on teen fertility in transition, recent and historical trends in the US, showed that between 1991 and 2005 in the US, teenage fertility declined and rose unexpectedly in 2006 and 2007. The changes in US teenage fertility were attributed to changes in the use of contraceptives by teenage women. In addition, young women who were born in poor families in the US were more likely to become teen mothers because they initiated sexual intercourse early and they could not afford and access contraception services and abortion due to financial instabilities (Santelli and Melnikas, 2010). In countries like Brazil, Costa Rica, Jamaica, Mauritius and Thailand more than 40 percent of married adolescent females use contraception. In Zimbabwe, changes in teenage fertility have been noticed; however, the factors behind the fluctuation of teenage fertility are not highlighted and this research seeks to give an insight of the determinants of teenage fertility.

2.6.4.1. Contraception knowledge and use

It has been documented that in countries such as Kenya, Zimbabwe, Tanzania and Gambia levels of sexual activity among teenagers were high in the 1980s and there was low prevalence of contraceptive use resulting in increased teenage fertility (Van De Walle and Foster, 1990). Low prevalence of contraception in these countries was due to the fact that sex education and unrestricted access to contraceptives was seen as encouraging sexual promiscuity among the teenagers hence all attempts to promote contraceptive use was regarded as a taboo in the society. More than 75 percent of adolescents in Botswana,

Zimbabwe and Kenya reported knowing about modern contraception compared to 29 percent in Mali and 1 in 5 adolescents in Botswana and Zimbabwe were using a modern method of contraception especially the pill (Bledsoe and Cohen, 1993). Similarly, it has been reported by Blanc and Way (1998) that levels of knowledge about contraception vary largely among sub-Saharan African countries with lowest levels reported in Madagascar and Nigeria and highest levels of knowledge being in Kenya, Rwanda and Zimbabwe where at least 90 percent of teenagers were familiar with some contraception methods. The proportion of women aged 15-19 who reported using family planning methods ranged from 2 percent in Niger, Rwanda and Senegal to 23 percent in Cameroon (Blanc and Way, 1998). On the other hand, it was found that contraceptive prevalence was also below 10 percent in 12 out of 22 sub-Saharan African countries (McDevitt *et al*, 1996).

Blanc and Way (1998) conducted a study which looked at adolescent sexual behaviour and contraceptive use and knowledge in developing countries. The study found that in most sub-Saharan African countries, contraceptive use was higher among sexually active unmarried teenagers than among married teenagers. In contrast, in Latin America and the Caribbean, contraceptive use was found to be higher among married teenagers than among sexually active unmarried teenagers (Blanc and Way, 1998). Furthermore, DHS studies which were conducted in the late 1980s and early 1990s from 19 sub-Saharan African countries and 9 Latin American countries showed that contraceptive prevalence is lower among unmarried teenagers compared to married teenagers (McDevitt *et al*, 1996). Similarly, it has been indicated by McDevitt *et al* (1996) that in sub-Saharan Africa about 44.8 percent of married women aged 15-19 years use contraceptives as compared to about 42.9 percent of unmarried women in the same age group. Data indicates that in Africa about 6 in 10 adolescent females and 2 in 10 in Latin America who used contraception were married. Studies which were carried out in West Africa, Nigeria, Liberia and Gambia found high levels of adolescent sexual activity and very high levels of contraceptive use among teenagers (Nichols *et al*, 1986 and 1987 cited in Boohene *et al*, 1991). Of importance is the notion that contraceptive usage was found to be widespread among sub-Saharan adolescents with about 72 percent of sexually active adolescent girls reporting in 1996 that they had ever used contraceptives. This is remarkable because one would expect adolescent fertility to be low or decreasing given the high widespread of contraception methods and knowledge.

Using the 1984 ZRHS and the 1988 ZDHS, fertility levels were found to be high regardless of high contraception prevalence in Zimbabwe (Adamchak and Mbizvo, 1990). These results alarmed many researchers such that Boohene and Dow (1987) argue that contraception in Zimbabwe was not used as a birth control method rather it was used primarily for birth spacing. Conversely, Mturi and Joshua (2011) indicate that high contraception prevalence and use in Zimbabwe led to a decline in TFR from about 7 births per 1000 in the 1980s to about 3.8 births per 1000 in 2006. The decline was attributed to consistent usage of contraceptives by women who were residing in Mashonaland West, Mashonaland Central, Mashonaland East, Midlands and Masvingo provinces of Zimbabwe and mostly in urban areas (Mturi and Joshua, 2011). Over the years from 1980s to date, Zimbabwe has become successful and is the second leader after South Africa in the region in terms of contraceptive use but teenage fertility remains high. Almost all teenagers in Zimbabwe have heard about contraceptives, however, teenage childbearing keeps on increasing hence it is crucial to determine the extent at which contraception usage affects teenage fertility.

2.6.5. Abortion

In sub-Saharan Africa, rates of abortion are very high and they continue to increase. It has been reported that worldwide about 46 million pregnancies are terminated each year (WHO, 2012). Of these 46 million, 27 million were legally terminated and 19 million were done illegally by either traditional healers or through consulting friends (Bearinger *et al*, 2007). Of the 19 million unsafe abortions, it was reported that 3 percent happen in developing countries each year. In the countries where abortion is illegal like Zimbabwe, it has been highlighted that they result in more than 30 percent of maternal deaths (WHO, 2006; 2012). Maternal death cases are high in developing countries with 2.5 million which is almost 14 percent of all unsafe abortions being practiced by teenagers (Coeytaux, 1988; Bearinger *et al*, 2007). Highest rates of unsafe abortions by teenagers (25 percent) were found in Africa whereas in Asia, Latin America and the Caribbean the rates were much lower.

Abortion in Zimbabwe is perceived as taboo and the law punishes those who terminate pregnancy unless it is an exceptional case threatening human life. In many African countries, data on abortion is unreliable, as such; figures on abortion might be underreported especially in countries like Zimbabwe where it is a criminal offence. Bongaarts and Bruce (1995) pointed that service providers in hospitals and clinics must be friendly, provide sympathetic counselling in an impersonal urban environment to ensure that teenagers feel comfortable

when accessing family planning services. In addition, confidentiality of these services must be emphasized in media messages since teenagers are afraid of their parents finding out that they are seeking such services. Bongaarts and Bruce (1995) argue that the needs of young people are evident from high rates of premarital conception, mortality and morbidity that are a result of unsafe abortions and from the fact that half of the people in the world with HIV are younger than 25 years. As a result, media in the form of newspapers have informed the public about many cases of baby dumping or abandoned newly born babies and infants and this has made the Zimbabwean public to be aware of the problem of unintended pregnancy and childbearing (Adamchak and Mbizvo, 1990). Consequently, the Ministry of Health started addressing teenage health issues and in 1978 the YAS was established as part of the Zimbabwe National Family Planning Council to provide family life education in primary and secondary schools (Boohene *et al*, 1991).

Studies conducted in some African countries found that one ward at Kenyatta, a national hospital in Nairobi, admitted about 20 to 40 cases of incomplete abortion each day (Rogo and Nyamu, 1989). Many cases of incomplete abortions were from adolescents who wanted to pursue their education or career and those who could not afford to support the child. Similarly, Nicholas, Ladipo, Paxuan and Otolorin (1986) conducted a study in Nigeria of 1800 never married women aged 14-25. In the study, it was found that almost half of female students and two thirds who were not students had been pregnant and almost all had terminated their pregnancies with induced abortion (Nicholas *et al*, 1986). In Kenya, Ajayi *et al* (1991) cited in Zabin and Kiragu (1998) indicate that one fourth of all the sexually active 12-15 year old girls and one third of those aged 16-19 had sought an abortion. On a similar notion, Mirembe (1994) documents that 68 percent of abortion patients at a local teaching hospital in Uganda were aged 15 to 19 and 79 percent of these teenagers were still in school. Abortion has many adverse effects especially if it is conducted illegally by traditional healers and unprofessional individuals. It leads to infection, infertility and mortality among young women. Teenagers are at risk mainly because in most countries in sub-Saharan Africa, abortion is illegal; therefore, teenagers terminate their pregnancies illegally without any professional assistance (Zabin and Kiragu, 1998). Singh and Henshaw (1996) cited in Bongaarts (1997) indicate that abortion is high in all the regions with highest rates reported in Asia (24.4 million abortions), followed by Latin America (4.8 million abortions) and lastly Africa (3.8 million abortions). The limitation of these figures is that they do not specify the number of abortions which were done by teenagers and the ones by older women so that we

can compare abortion rates of these age groups. It is important to acknowledge that in many African countries, data on abortion is unreliable because abortion is considered illegal by the law and a taboo in many societies (Coeytaux, 1988).

From these statistics it can be deduced that many teenagers in sub-Saharan Africa are resorting to abortion. This suggests that there is extreme motivation among teenagers especially those who are still enrolled in school to avoid teenage childbearing thereby creating a potential market for contraception. However, contraception methods are not easily accessible to teenagers especially those who reside in rural areas hence the potential market for contraception has failed to be realised in many African countries.

2.7. Socio-economic determinants

Chemhuru *et al* (2011) conducted a study on influences of fertility control and early parenthood in a rural district of Zimbabwe. In the study, it was found that the majority of the respondents, about 60 percent had their first sexual intercourse at the age of 16 (Mashamba and Robson, 2002). This was attributed to teenager's socio-economic status such as religion, culture and unequal gendered sexual relations which influenced them to indulge in unprotected sex thereby exposing them to the risk of pregnancy, childbearing, HIV/AIDS and STIs.

2.7.1. Religion

Religion can influence fertility behaviour through differences among groups in norms concerning contraceptive use, marriage, abortion and desired family size. Innovative behaviour for example birth control methods in the traditional religion were regarded as unnatural and sinful and people believed that the use of birth control results in bareness, death of the child and sickness as punishment from their ancestors (Caldwell and Caldwell, 1987). In a study conducted in Manicaland province of Zimbabwe it was found that fertility levels have been declining in all religious sectors and little fertility differentials were found between Christians and apostolic (Gregson *et al*, 1999). Religion has been noted as a socio-cultural indicator which affects fertility and teenage fertility. It can influence fertility directly by imposing sanctions on birth control practices or by legitimising certain less effective contraception methods (McQuillan, 2004). In addition, religion indirectly indoctrinates its followers with a moral and social belief of marriage and family that emphasizes the virtues of reproduction (Chamie, 1981; Lehrer, 1996; McQuillan, 2004). As such, Harwood-Lejeune (2001) showed that Christian women were associated with higher ages at marriage and first

birth and a higher proportion of premarital births compared to Moslem women. Makatjane (2002) through the use of logistic regression model showed that other Christians were 1.3 times more likely to have experienced pre-marital childbearing than Catholics.

2.7.2. Place of residence, family structure and wealth index

Manlove, *et al* (2000) highlight socio-economic factors that were associated with increased teenage fertility in US in the 1980s. The factors were place of residence, negative changes in family environments for example increase in family disruptions, family financial instability and an increase in the proportions of teenagers having sex at an early age. In Lesotho it was found that teenagers who resided in urban areas were 1.4 times more likely to have given birth compared to their rural counterparts (Makatjane, 2002). In the US it was found that Black teenagers who resided in the metropolitan areas initiated sexual intercourse earlier than other teenagers and have higher rates of premarital pregnancy (Hogan and Kitagawa, 1985). In addition, it was observed that teenage girls who grew up in a poor female-headed family especially in rural areas or who saw their sisters becoming teenage mothers were more likely to also become teenage mothers and accept single parenthood in their lives (Hogan and Kitagawa, 1985). Similarly, Hogan, Sun and Cornwell (2000) through the use of nationally representative surveys, found that an increase in the number of single parents in America is associated with high rates of teenage fertility due to lack of parental supervision.

Previous demographic research has been unsuccessful in identifying the socio-economic and family factors that increased the rates of fertility among Black teenagers in US. Two major factors which were found to determine the likelihood of a teenage girl becoming pregnant. These are, the age at which they become sexually active since earlier age at sexual relations increases the period of exposure to the risk of unintended pregnancy and the regularity of contraceptive practice to prevent unintended pregnancy (Manlove *et al*, 2000; Hirschman, 1994). Black teenagers from poor families in the US were found to initiate sex early and could not regularly afford to use contraceptives owing to their background (Hogan and Kitagawa, 1985).as a result, these factors led to a dramatic and unprecedented increase in teenage birth rate of nearly 25 percent between 1986 and 1991 in the US. However, in the 1990s, the socio-economic environment which inhibits fertility for example families with both parents, led to a decrease in teenage birth rate in the US by approximately 18 percent between 1991 and 1998 (Manlove *et al*, 2000). It was only when teenage fertility constituted

about 20 percent of total births in the United States that it was regarded as a problem and special services for teenagers became widely recognized (Darabi *et al*, 1979).

According to Bledsoe and Cohen (1993) westernization and modernisation of African societies weakened familial authority which resulted in increased premarital adolescent fertility in Africa and similar results were also found by Meekers (1994) and Gage (1998). Teenagers constitute about half of the global population and many reside in rural areas. In a study on global perspective on sexual and reproductive health of adolescents, it was highlighted that about a third of unmarried teenagers in many developed countries and in sub-Saharan Africa excluding Nigeria and Rwanda were sexually active (Bearinger *et al*, 2007). High rates of sexual activity in Africa are partly attributed to several socio-economic factors which are faced by teenagers. Miller, Benson, and Galbraith (2001) conducted a study on how the family especially parents influence the risk of adolescents becoming pregnant. In the study, although it was based on literature and there was no specific data that was used, it was found that the closeness of parents to their children, close supervision of their children's activities, their values against teen intercourse and the place they reside in reduce the risk of teenage pregnancy (Miller *et al*, 2001). The other limitation of the research was the use of Bongaarts (1972) framework as a theoretical framework of the study as it fails to explain the origins of the social and cultural influences that constrain fertility in high-fertility settings (Hirschman, 1994). Similar to this research is a study on sexual and fertility behaviours of American female teenagers from 1985 to 1995 conducted by Hogan *et al* (2000). Using nationally representative sample survey data from the 1995 National Survey of Family Growth, it was found that family life experiences have strong systematic relationships with teenage fertility (Hogan *et al*, 2000). As such, it was discovered that there is high risk of teenage pregnancy among teenagers living in a single parent household because of lack of strict or close parent supervision.

2.7.3. Education

Increased female education in sub-Saharan Africa has been found to be highly correlated with a decrease in the proportions married at young ages (Van De Walle and Foster, 1990). Although increased schooling years is associated with low fertility rates, Lesthaeghe, Kaufman and Meekers (1986) argue that school going teenagers are at higher risks of premarital sexual relations hence postponed marriages as a result of educational attainment are correlated with higher premarital fertility. Contrary to these findings, Makatjane (2002)

conducted a study on premarital sex and childbearing in Lesotho through the use of logistic regression and found no evidence of a relationship between education and premarital fertility. Similar to Makatjane (2002) findings, Kravdal (2002) conducted a research for 22 sub-Saharan countries and found that there were no significant effects of education on fertility in Zimbabwe, Malawi, Ghana, Burkina Faso and Uganda. Kravdal (2000) questioned findings from previous studies of negative effects of education on fertility because place of residence in these studies was not controlled for thereby yielding biased results.

Thomas and Maluccio (1995) through the use of OLS regression model found that, in Zimbabwe, education had a negative and significant effect on number of children ever born among teenagers. Similarly, through the use of time hazard models to estimate the probability of women having a first birth during teenage years, Gupta and Leite (1999) found that educational level was the main and consistent factor associated with low probabilities of giving birth during adolescent. Similarly, it was found that in many developing countries there is a correlation between women's level of education and fertility regulation with those who are most educated having fewer children (Martin, 1995; Thomas and Maluccio, 1995; Caldwell, 1994). Indogo and Pazvakawambwa (2012) conducted a study in Namibia and they also found that education had a depressing impact on fertility. In addition, in the US, adolescents whose parents were better educated were found to be 23 percent less likely to initiate sexual intercourse and 52 percent more likely to use a contraceptive at first intercourse (Hogan *et al*, 2000).

2.8. Consequences of teenage fertility

2.8.1. To the teenage mother

There is vast literature on the adverse effects of teenage sexual activity, pregnancy and childbearing. After having their first birth, teenagers mainly suffer from pregnancy-induced high blood pressure (PPD, 2013; WHO, 2012; Zabin and Kiragu, 1998). In addition, teenagers who are pregnant suffer from anaemia mainly because anaemia is linked to menarche even in the absence of pregnancy. In Nigeria in the early 1990s, it was reported that 60 percent of 496 teenage mothers were anaemic and anaemia was reported to be twice times more pronounced among teenage mothers as compared to older women (WHO, 1994; Zabin and Kiragu, 1998). Inadequate prenatal care in many African countries expose teenagers to severe problems when giving birth for example delayed or obstructed labour, birth canal ruptures and at times death (Nour, 2006; United Nations, 1989). WHO (1994) succinctly

reported that maternal deaths of teenagers may double that of older women. In many developing countries, pregnancy complications and childbirth are the main causes of death among teenagers and accounts for about 50 000 deaths each year (PPD, 2013).

Teenage mothers face many problems such as dropping out of school which provides them with limited economic opportunities and the implication of teenage fertility is that teenage childbearing is related to high fertility (Kaufman *et al*, 2001; Pillai, 1988). Garenne *et al* (2001) argue that problems of school dropout and abortion among pregnant teenagers are not a result of teenage childbearing itself but they stem from the condemnation of childbearing under conditions which are not approved by the society. Teenagers who fall pregnant whilst enrolled in school are forced to drop out of school jeopardizing their quality of life and reducing their chances of being employed (Kaufman *et al*, 2001; Hofferth, 1987). This is mainly common in Zimbabwe where teenagers who fall pregnant whilst at school face exclusion and after giving birth only a few will have the chance to go back to school thereby reducing teenager's career choices and economic options. This has been supported by the Executive Director of United Nations, Nafis Sadik who said "... adolescent fertility worldwide continues to be a roadblock to girls and women's educational attainment, their status and their full participation in society" (McDevitt *et al*, 1996: 2). In many countries it has been documented that unmarried teenagers who indulge in sexual intercourse are at the risk of contracting STIs and HIV/AIDS compared to married teenagers, however, Nour (2006) contested this statement. Nour (2006) argues that a study which was done in Kenya, Zambia and Uganda showed that married teenagers had a 50 percent, 59 percent and 89 percent, respectively, higher likelihood than unmarried teenagers of becoming infected with HIV.

2.8.2. To the child

Teenagers usually give birth to premature, low birth weight babies and hence they suffer from slower developmental progress, retarded growth and poor school performance (Bledsoe and Cohen, 1993; WHO, 1994). The chances of the babies surviving are very low resulting in high infant mortality (Nour, 2006). In Zimbabwe it has been reported that teenagers below the age of 14 experienced perinatal mortality rates of 73 deaths per 1000 deliveries (Mahomed *et al*, 1989 cited in Zabin and Kiragu, 1998). Many children born to teenage mothers are neglected, abused and abandoned affecting the developmental process of the

children as they will be deprived of the attention they need from their mothers (Boohene *et al*, 1991).

2.9. Implications to population growth

If Zimbabwe tries to limit its population growth it might not succeed because childbearing at early ages is associated with higher fertility over women's reproductive lives. This is because the years a woman is exposed to childbearing are more if she gives birth at an early age compared to those who postpone childbearing. As a result, rapid population growth becomes a severe challenge to the country in terms of providing basic facilities such as education and health services for its people.

2.10. Summary of the chapter

It has been shown that teenage sexual behaviour, pregnancy and childbearing is a major issue globally. The proximate determinants behind teenage fertility vary from country to country and premarital fertility rates in many countries remained high as compared to post-marital fertility. In almost all the countries reviewed, contraception, proportions married, age at first marriage and age at first sex have been found to be the main proximate determinants of teenage fertility. Furthermore, socio-economic factors namely religion, education and place of residence and family structure have been found to be important in many countries. High teenage fertility rates were found among teenagers who were not educated and those who were residing in rural areas. Teenage pregnancy and childbearing comes with fatal health problems to the child and to the mother which might lead to death. In addition, teenage pregnancies hinder the country's efforts of reducing population growth because childbearing at early ages is associated with higher fertility over women's reproductive lives.

CHAPTER 3: THEORETICAL FRAMEWORK AND METHODOLOGY

3.1. Background and Introduction

This chapter has two objectives, firstly it explains the theoretical framework for this study and secondly it explains the research design used in this study. To identify the factors responsible for fertility reduction, Davis and Blake (1956) came up with an intermediate fertility variable framework. This framework is comprised of background determinants which influence fertility indirectly and 11 proximate fertility determinants which influence fertility directly. Although this framework has its setbacks such as incomplete and inaccessible data on frequency of intercourse, it is an important framework in analysing the intermediate fertility variables. To deal with some of the shortcomings of Davis and Blake's (1956) intermediate fertility variable framework, Bongaarts came up with a framework of proximate determinants of fertility and techniques for analysing and evaluating the impact of these proximate determinants on fertility. This research is based on Bongaarts (1978, 1982) proximate determinants of fertility as such; this chapter explores these proximate determinants and apply them to teenage fertility. This is achieved through the use of quantitative approach in analysing data from the 2010-11 ZDHS. Multiple Logistic regression model, Kaplan-Meier Survival estimator and Cox Proportional Hazard model are the methods used to investigate proximate determinants of teenage fertility in this study.

3.2. Theoretical framework for this study

3.2.1. Bongaarts proximate determinants of fertility

The intermediate fertility variables by Davis and Blake (1956) are also known as proximate determinants of fertility in Bongaarts (1978; 1982) framework. These are the biological and behavioural factors through which socio-economic, cultural and environmental variables affect fertility as shown in Figure 3.1 below. Bongaarts (1978) framework breaks 11 of Davis and Blake (1956) intermediate fertility variables into 8 factors which are then divided further into 3 categories. These are:

3.2.1.1. Exposure Factors

- Proportion married

3.2.1.2. Deliberate marital fertility control factors

- Contraception

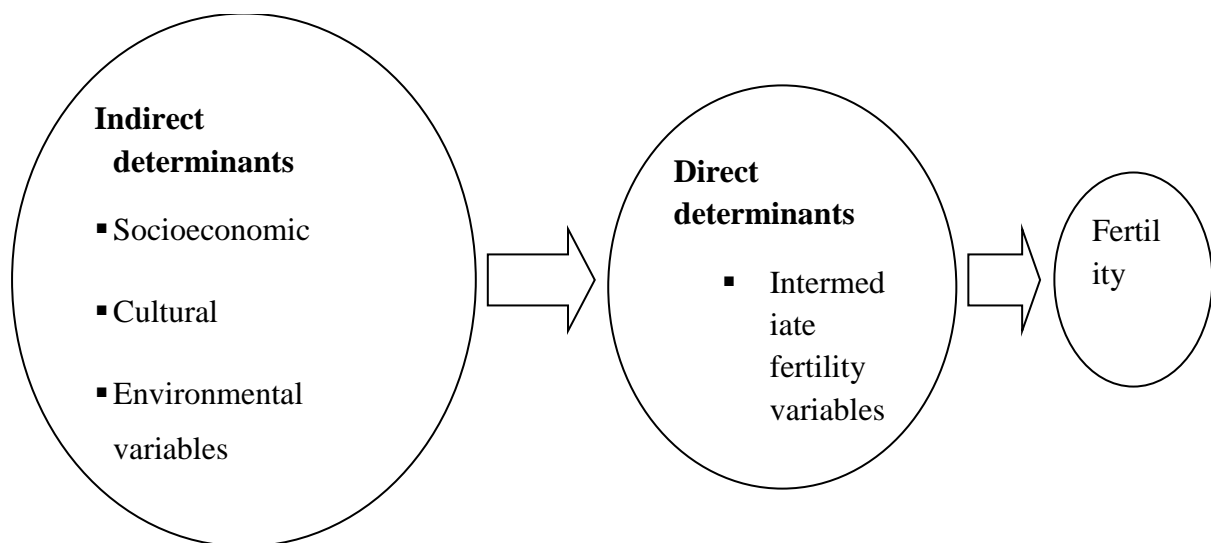
- induced abortion

3.2.1.3. Natural marital fertility factors

- Lactational infecundability
- Frequency of intercourse
- Sterility
- Spontaneous intrauterine device
- Duration of the fertile period

As such Bongaarts (1978; 1982) argues that socioeconomic factors influence fertility indirectly through these eight proximate determinants of fertility as shown in Figure 3.1 below. Since Figure 3.1 is specifically for total fertility, this research focuses more on Figure 3.2 by McDevitt *et al* (1996).

Figure 3.1: Determinants of fertility



Source: Bongaarts (1978; 1982)

An article by Bongaarts (1982) on fertility inhibiting effects of intermediate fertility variables reports that two criteria can be used to select the intermediate variables that are very vital. The first criteria being the sensitivity of fertility to variations in the different intermediate variables thus a variable is relatively not crucial if large variations in it results in minor changes in fertility (Bongaarts, 1982). The second criterion is the extent of factors variability

among populations over time, meaning that a relatively stable intermediate variable can contribute little to explaining fertility differentials and is hence less important (Bongaarts, 1982). As such it is argued that the primary characteristic of an intermediate fertility variable is its direct influence on fertility. Using these two criteria together with Bongaarts (1978)'s main equation which is $TFR = C_m * C_c * C_a * C_i * TF$, four intermediate fertility variables were found to have greater effects when analysing fertility levels and trends in different populations. These intermediate fertility variables are, the proportion married; postpartum infecundability, contraception and induced abortion (Bongaarts, 1978; 1982). These four factors according to Bongaarts (1982) explain about 96 percent of the variance in total fertility rate in a sample of 41 populations that included developing and developed countries. Since these proximate determinants were for total fertility, this study seeks to identify the main proximate determinants of teenage fertility specifically in Zimbabwe. Bongaarts (1978) equation is highly aggregate and its data requirements are relatively modest thereby making wide application possible. Since this equation is highly aggregate, it will be very difficult to apply to this research because this study looks at a proportion of fertility which is teenage fertility. As such, instead of using Bongaarts (1978) equation, this study uses multiple Logistic regression equation, Kaplan-Meier survival estimator equation and Cox proportional hazard equation to find out the proximate determinants which are mainly responsible for differentials in teenage fertility.

3.3. A brief description of the proximate determinants of teenage fertility

3.3.1. Exposure to intercourse

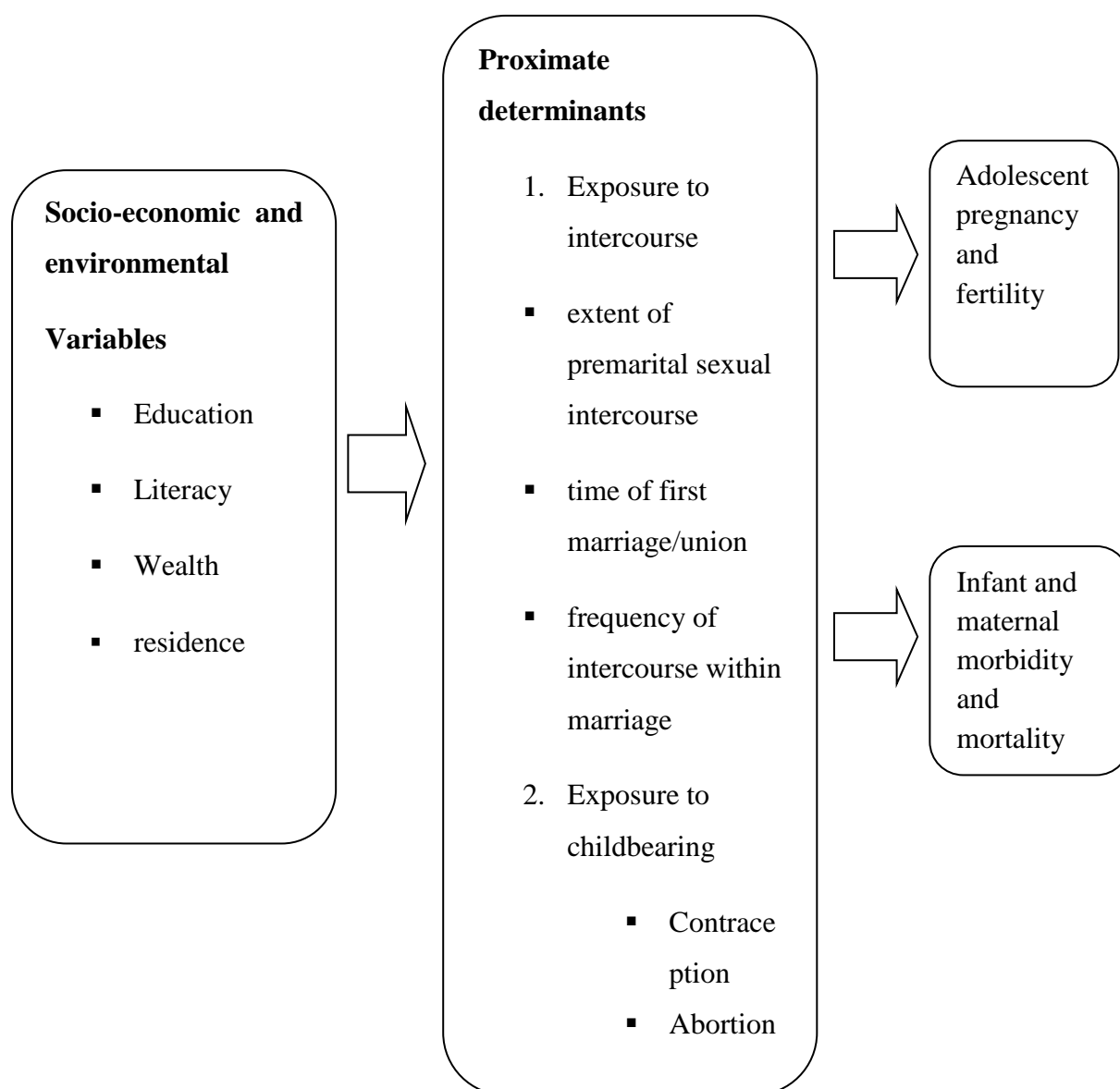
3.3.1.1. Proportion of married teenagers

Proportions married (marital status) has been reported as the important proximate determinant of fertility in Bongaarts (1978; 1982) framework. This independent variable measures the contribution of proportion of married teenagers to teenage fertility.

3.3.1.2. Age at first marriage

This gives information about the age at which women got married in order to determine whether they got married when they were teenagers or not. The median age at first marriage for women according to the ZDHS was 19.7 years in 2011 which is much higher compared to other African countries (ZIMSTAT and ICF International, 2012).

Figure 3.2: Determinants of teenage fertility



Source: McDevitt *et al* (1996)

3.3.1.3. Frequency of intercourse and age at first sex

This measures normal variations in the rate of intercourse including those which are a result of temporary separation or illness (Bongaarts, 1978; 1982). In addition, the age at which teenagers engage in sexual intercourse is a vital determinant of fertility as it exposes them to higher risks of childbearing. Voluntary abstinence is the only one which is not included whether it is total or periodic to avoid pregnancy.

3.3.1.4. Extent of premarital intercourse

This variable measures the degree at which teenagers engage in sexual intercourse outside marriage. This exposes teenagers to the risk of pregnancy and childbearing.

3.3.1.5. Lactational infecundability

Following pregnancy, a woman remains infecundable, meaning that she will be unable to conceive until the normal pattern of ovulation and menstruation is restored (Bongaarts, 1982). The duration of the period of infecundity is a function of the duration and intensity of lactation.

3.3.2. Exposure to childbearing

3.3.2.1. Contraception

Currently, contraceptive practice is the proximate determinant of fertility that primarily has been responsible for a wide range in the fertility levels within marriages (Bongaarts, 1978; 1982). It refers to any deliberate parity-dependent practice such as abstinence and sterilization undertaken to reduce the risk of conception (Bongaarts, 1978). Thus the absence of contraception and induced abortion implies the existence of natural fertility.

3.3.2.2. Induced abortion

This independent variable includes any practice that deliberately interrupts the normal course of gestation (Coeytaux, 1988). Induced abortion is one of the proximate determinants which were reported to have a negative impact on fertility, even though in many countries data on abortion is unreliable.

3.4 METHODOLOGY

3.4.1. Key research questions

- Describe the trends and levels of teenage fertility in Zimbabwe from the year 1988 to 2011.
- What are the major determinants of teenage fertility in Zimbabwe?
- What are the effects of proximate determinants of fertility on teenage childbearing?

3.4.2. Source and nature of data

Data for this study is drawn from the 2010-11 ZDHS. Throughout the developing world, the DHS is one of the largest programs producing cross-national and comparable quantitative information on fertility and reproductive health (ZIMSTAT and ICF International, 2012). Introduced in 1984 by the United States Agency for International Development (USAID),

Demographic Health Surveys (DHS) aim to provide data and analysis in developing countries on the population's health, maternal and child health, nutrition of women and children and HIV/AIDS (ZIMSTAT and ICF International, 2012). In Zimbabwe, the surveys were conducted by the Central Statistics Office as part of the Zimbabwean National Household Survey Capability Programme. This research uses quantitative data which is drawn from the 2010-11 ZDHS. The 2010-11 ZDHS is a follow up on the 1988, 1994 and 2005-06 ZDHS surveys with the major aim of providing updated estimates of basic demographic and health indicators specifically maternal and child health indicators which impact on the progress of the population and health programmes (ZIMSTAT and ICF International, 2012).

3.4.3. Data

Three questionnaires were used for the 2010-11 ZDHS namely, the household questionnaire, the woman's questionnaire and the Man's questionnaire. This study looks at the proximate determinants of teenage fertility as such it will only focus on the woman's questionnaire because it contains information of all women aged 15-49. In this questionnaire women were asked to report information concerning their fertility preferences, breastfeeding and infant feeding practices, marriage and sexual activity, as such, it forms the basis of the study's sources of information (ZIMSTAT and ICF International, 2012). The questionnaire was written in three languages namely Shona, English and Ndebele and an option of other languages was included.

3.4.4. Research instrument

ZDHS is a survey which involves the collection of data in order to have answers to population issues such as women's and child health issues (ZIMSTAT and ICF International, 2012). The survey is a self-report survey whereby individuals respond to a variety of questions. This study uses the ZDHS 2010-11 to obtain the data which was provided by women respondents.

3.4.5. Sample design

The 2010-11 ZDHS is the fifth DHS survey conducted in Zimbabwe. The sampling frame for the 2010-11 ZDHS was 10 828 households and of the 10 828, 10166 were found to be unavailable during the survey fieldwork. Of importance is that eventually of the unavailable households, 9756 households were successfully interviewed resulting in a high response rate of 96 percent (ZIMSTAT and ICF International, 2012). 9831 suitable women were identified in the households which were interviewed and of those women 9171 were managed to be

interviewed successfully resulting in a response rate of 93 percent. Women response rate was found to be higher in the 2010-11 ZDHS as compared to the response rate found in 2005-06 ZDHS (ZIMSTAT and ICF International, 2012).

3.4.6. Sampling selection and method

To come up with relevant data, a nationally representative sample of households was selected. To qualify for the survey all women were supposed to be aged 15-49 and all men to be aged 15-54 and to be usual residents of the sampled households or to have slept in the household a night before the interview. The unit of analysis of this study are individual teenage females between the ages 15-19 in the period 2005-2011. The sample was drawn according to a multistage and area probability procedure was designed to ensure that every household had the same chance of being selected. Stratified, two stage cluster sampling design was used to select the sample for the 2010-11 ZDHS. The sample frame which was used for the first stage of the selection of 2010-11 ZDHS samples was based on census which was carried out in 2002 (ZIMSTAT and ICF International, 2012). For the second stage of sampling, households were used as sampling units. The target sample for the 2010-11 ZDHS was set at 10 828 households after taking into account the importance of obtaining estimates of adequate precision for key domains, the level of non-response at the household and individual woman and availability of resources (ZIMSTAT and ICF International, 2012). A complete listing of households was done in July and August 2010 in every Enumeration Areas (EAs) selected for the ZDHS. Large EAs were segmented into smaller units and one of the segments was selected with probability proportional to size. Weights were also applied and for households they were adjusted for non-response to get the final sampling weights.

3.4.7. Study population

A study population is a group of individuals taken from the general population who share common characteristics (Welman, Kruger and Mitchell, 2005). The study population of this research is the total number of teenage girls who were between the ages 15-19, in the period 2005-2011. Data regarding this study population is taken from 2010-11 ZDHS. Table 3.1 below shows fertility of women aged 15-19 from the period 2005 to 2011. It is presented that, of the total 3,795 teenagers, 1,230 gave birth. It is shown in Table 3.1 that 32.41 percent of all the teenagers gave birth whereas 67.59 percent never gave birth towards total fertility. From Table 3.1 below, it is clear that teenagers' contribution to total fertility is significant hence if left uncontrolled it will result in high fertility rate which is a problem to the country.

Table 3.1: Distribution of teenage females by childbearing status, 2005-2011

Teenage childbearing	Frequency	Percentage
Never gave birth	2,565	67.59
Gave birth	1,230	32.41
Total	3,795	100.00

3.4.8. Background characteristics and distribution of the study population

In Table 3.2 below, total number of teenagers in the period 2005-2011 is 3,795. Many teenage girls had their first birth when they were aged 18 with 26.50 percent of 1,230 reported giving birth at the age of 18 followed by those who were aged 17 with 24.96 percent of 1,230 reported giving birth at the age of 17. Of importance is that, during the time of the survey 0.24 percent that is 3 teenagers out of 1,230 between the ages 15-19 reported giving birth at the age of 12. In total it is shown that, out of 3,795 women aged 15-24, 1,230 gave birth before they turned 20. Of the 3,795 women between the ages 15-24, 47.04 percent (1,785) were married before the age of 20. The majority of teenagers that is 52.96 percent (2,010) never married during their teenage years. Teenagers who engaged in sex when they were 19 years and below were 58.26 percent (2,191) while 41.74 percent (1,570) engaged in sexual intercourse when they were over the age of 19. Contraceptive use among teenagers was very low with only 39.71 percent reported ever using contraceptives. The majority of teenagers that is 60.29 percent of 3,795 reported that they never used contraceptives. Few teenagers reported that they once terminated pregnancy that is 4.56 percent (173) whilst the majority 95.44 percent (3,622) never aborted.

Teenagers with primary education were very few that is 22.40 percent of 3,795. Many teenagers in Zimbabwe have reached their secondary level of education with 74.57 percent of 3,795 teenagers having attained their secondary education and only 0.37 percent of 3,795 reported never attended school at all. Teenagers who reported to be from lower and middle households were 34.84 percent and 39.26 percent respectively. The least percentages were reported for teenagers who came from higher households that is 25.90 percent of 3,795. This shows that the bulk of teenagers are from middle class households. The majority of teenagers resided in rural areas, 61.45 percent while 38.55 percent resided in urban areas. During the time of the survey, many teenagers were concentrated in Harare, Midlands, Manicaland and Bulawayo with 12.73 percent, 11.12 percent, 10.80 percent and 10.54 percent respectively.

Table 3.2: Demographic description of the study sample, 2005-2011

Explanatory variable	N	Column Percentage
Age at first birth		
12	3	0.24
13	7	0.57
14	28	2.28
15	84	6.83
16	193	15.69
17	307	24.96
18	326	26.50
19	282	22.93
Total	1,230	100.00
Age at first sex		
Had sex below the age 19	2,191	58.26
Had sex above the age of 19	1,570	41.74
Total	3,795	100.00
Marital status		
Never married	2,010	52.96
Married	1,785	47.04
Total	3,795	100.00
Contraceptive use		
Never used contraception	2,288	60.29
Ever used contraception	1,507	39.71
Total	3,795	100.00
Abortion		
No	3,622	95.44
Yes	173	4.56
Total	3,795	100.00
Educational attainment		
Primary	864	22.77
Higher	2,931	77.23
Total	3,795	100.00
Wealth Index		
Poor	1,322	34.84
Middle	1,490	39.26
Rich	983	25.90
Total	3,795	100.00
Place of residence		
Rural	2,332	61.45
Urban	1,463	38.55
Total	3,795	100.00
Province		
Manicaland	410	10.80
Mashonaland Central	352	9.28
Mashonaland East	337	8.88
Mashonaland West	388	10.22
Matebeleland North	297	7.83
Matebeleland South	372	9.80
Midlands	422	11.12
Masvingo	334	8.80
Harare	483	12.73
Bulawayo	400	10.54
Total	3,795	100.00

Lowest percentages of teenagers in Table 3.2 above were found in Matebeleland North, Masvingo and Mashonaland East with 7.83 percent, 8.80 percent and 8.88 percent respectively. It is shown in table 3.2 above that there are no large differences in the distribution of teenagers across provinces.

3.4.9. Missing values

According to (Acock, 2005) a missing value is a variable that should have a response but does not have a response due to the interviewer not asking the question or the interviewee refusing to answer the question. As such, missing values are very difficult to avoid in any type of research and in this study there were few missing values.

3.4.10. ZDHS sampling errors

Generally, in all surveys there are sampling errors and data limitations which are encountered. Sample surveys are affected by two types of errors namely sampling errors and non-sampling errors. Sampling errors are a measure of the variability between all possible samples hence they can be evaluated statistically. Sampling errors are usually measured in terms of the standard error which is the square root of the variance (Welman *et al*, 2005). The standard error is important in that it can be used to calculate the confidence interval within which the true value for the population can reasonably be assumed to fall. Looking at the total women sample, the design effect averaged over all the variables presented is 1.35 (ZIMSTAT and ICF International, 2012). This means that due to multi-stage clustering of the sample, the average standard error is increased by a factor of 1.35 over that in an equivalent simple random sampling (ZIMSTAT and ICF International, 2012). On the other hand, non-sampling errors are a result of mistakes made in implementing data collection and data processing for example failure to locate and interview the correct household, misunderstanding of the question from both parties and data entry errors. Of importance is the notion that several efforts were made during the implementation of the 2010-2011 ZDHS to minimise non-sampling errors even though they are difficult to avoid and evaluate statistically.

3.4.11. Errors of this study

In this study, questions on timing of the event occurring are problematic in that respondents may fail to recall the actual dates when they first encountered the event thereby yielding biased responses. With Regards to teenage childbearing, the data may not be correct as teenagers may not feel comfortable to provide information on whether they have given birth

especially when the child was born out of wedlock as they are afraid of being judged by the interviewers and stigmatised by the society. In addition, teenagers will not be able to provide full information on abortion as it is illegal and viewed as a taboo by the society hence information on abortion by teenagers may also be unreliable. Since asking questions about abortion and contraception use is viewed as a taboo in many societies and the Zimbabwean society is no exception, normally, teenage respondents are reluctant and embarrassed to give correct information as they are usually younger than the interviewers hence it is difficult to know the extent of the non-response error owing to age difference. As a result information concerning abortion and contraception use might not be reliable.

3.4.12. Dependent variable

The dependent variable of this study comes in two forms namely, whether the teenager has ever given birth or not and the age at which teenagers had their first child.

3.4.12.1. Ever given birth

Ever given birth (teenage fertility) is an important dependent variable in this study. In many countries, early initiation of sexual intercourse exposes teenagers to the risk of pregnancy which results in early childbearing as teenagers will be afraid of using contraception methods owing to misinformation concerning use and side effects. In the ZDHS 2010-11, teenagers between the age group 15-24, regardless of their marital status were asked the question: “Have you ever given birth? This question was used to determine the proportion of teenagers who have given birth and those who have never given birth. As a result, a multiple logistic regression method is used to investigate this dichotomous variable which is coded 0 if a teenager did not give birth and 1 if a teenager gave birth.

3.4.12.2. Age at first birth

It has been reported that the age at which childbearing begins impacts on the health and welfare of the mother and the children and the postponement of first birth has led to fertility decline in many countries (ZIMSTAT and ICF International, 2012). As a result, age at first birth is an important dependent variable in this study. To ascertain information on the age at which teenagers had their first child, a question on whether they have given birth was asked and if so, at what age they had their first child. Data on age at first birth was recorded in single ages. To examine this timing variable, two survival analysis methods were used which are Kaplan-Meier Survival estimator and Cox Proportional Hazard model.

3.4.13. Independent variables

The independent variables are the proximate determinants of teenage fertility which are contraception, age, marital status, abortion and age at first sex. In addition, socio-economic variables namely education, wealth index and place of residence (rural, urban and province) are also important independent variables. This research examines the effects of these independent variables on teenage fertility.

3.4.13.1. Proximate determinants

3.4.13.1.1. Contraception

The decline in fertility in many African countries is attributed to contraception availability and use. Contraception is one of the four proximate determinants that were highlighted by Bongaarts (1978, 1982) as being an important fertility inhibitor. According to Maharaj (2001) contraception knowledge is the major weapon people need to be equipped with so as to accept and use contraception frequently. It has been argued that contraception has major influence on fertility in countries with high contraceptive awareness, availability and accessibility. This has been supported by Bongaarts and Watkins (1996) who argue that rapid fertility declines have been noticed in countries with high use of contraceptives. Teenagers in many African countries are well aware of contraception methods the problem is accessibility and availability of family planning services to the youth. In addition to accessibility and availability, health professionals are not friendly to teenagers as they stigmatise them when they are seeking contraception services hence the knowledge teenagers have about contraceptives will not be useful as they cannot access them. In contrast to Bongaarts and Watkins (1996) and Maharaj (2001), teenagers have the knowledge but there is low contraceptive use among them, hence, their contribution to total fertility is very significant. As a result of all these findings, teenagers responded to the questions: “Have you ever used or heard of (method)?” And “Are you currently doing something or using any method to delay or avoid getting pregnant?” “Have you ever used anything or tried in any way to delay or avoid getting pregnant?” This study focuses more on the responses to the question ever used contraception and in the data the responses given are close ended which are Yes or No.

3.4.13.1.2. Age

Several studies conducted on teenage childbearing indicated that the age of teenagers is very important when they are making their sexual decisions. Teenagers when they engage in sexual intercourse for the first time they are less likely to use any contraception method hence

they give birth at an early age (Blanc and Way, 1998). This is attributed to the negative attitude of health professionals towards teenagers who seek contraceptive services from the clinics which scares teenagers thereby exposing them to unprotected sex, unwanted pregnancy and early childbearing (Alli *et al*, 2013). Teenagers responded to two questions regarding their age. The questions are: “In which month and year were you born?” “How old were you at your last birthday?” The second question was used to check for consistency and accuracy. Similar to data on age at first birth, data for age is recorded in single ages. Age is a continuous variable and this study focuses mainly on the age group 15 to 19. Age as a continuous variable is examined through the use of logistic regression models and Cox Proportional Hazard Model.

3.4.13.1.3. Marital status

Marital status is an important proximate determinant of fertility which is used to find information on whether the teenager is married or not and also whether she gave birth in marriage or outside marriage. It is very difficult to define marriage in an African context because it is a process in which people follow different steps to become officially married. In the ZDHS, the time at which a woman started to stay with her first partner or husband was asked to all women who were not single. This was recorded as their first date of their marriage and in the data it is referred to as the date at first cohabitation. As such, according to the ZDHS, date of first marriage is the date at which a woman starts to have a stable relationship/marriage be it formalised or not (ZIMSTAT and ICF International, 2012). Cohen (1998) and Harwood-Lejeune (2001) argue that age at first marriage is rising in sub-Saharan Africa hence it is one of the factors which is resulting in fertility decline in countries like Zimbabwe, Kenya and Malawi. Marriage is linked to educational attainment as it has been argued that modern women prioritise education and postpone marriage however, in so doing, they are exposed to high risk of premarital childbearing during their teenage years. Marriage is a very crucial variable to consider because there is a very close link between marriage and onset of childbearing especially in African societies. As a result, fertility transition in developed and recently in developing countries has been acknowledged in many studies owing to the changes in the timing of first marriage and proportions married (Coale and Treadway, 1986; Casterline, 1994; Rosero-Bixby, 1996). In the ZDHS 2010-11, respondents were asked the following questions: “Are you currently married or living together with a man as if married?” “Have you ever been married or lived together with a man as if married?”

“What is your marital status now: are you widowed, divorced or separated?” “Is your (husband/partner) living with you now or he is staying elsewhere?”

3.4.13.1.4. Abortion

Abortion in Zimbabwe is illegal and data on abortion might be unreliable, however, it is important to understand the contribution of abortion on teenage fertility since some studies confirm that in other countries it led to teen fertility decline. According to Guldi (2008) access to abortion services is one of the factors which contributed to a decline in teenage fertility in the United States. Similarly, in Romania, abortion was the main birth control in the 1960s and it led to a sharp decline in fertility (Teitelbaum, 1972). In the previous studies for example Sklar and Berkov (1974); Angrist and Evans (1996); Levine *et al* (1999) found that legalized abortion led to a decrease in teen birth-rate by 2 percent to 13 percent. Frejka (1983; 1985) argues that although induced abortion contributes to fertility decline, its significance is less compared to the impact of contraceptives on fertility. Frejka (1985) goes on to argue that, the absolute effect of abortion on fertility is often substantial. In addition, it is also argued that in many countries studied, all things being the same, TFR would have been from approximately 20 percent to about 90 percent higher than it actually was had no induced abortions been performed (Frejka, 1985). In the ZDHS 2010-11, teenagers responded to the questions: Have you ever had a pregnancy that miscarried, was aborted or ended in a still birth? The responses to this question in the data were recorded as yes or no. In what month and year did that pregnancy end? Did you have any miscarriages, abortions or stillbirths that ended before 2005? When did the last such pregnancy that terminated before 2005 end? The evidence of abortion effects on fertility makes it vital to look at abortion as an intermediate variable in this study.

3.4.13.1.5. Age at first sex

The timing of first sexual intercourse in the analysis of adolescent fertility is generally an important factor. Manzini (2001) and Hofferth (1987) postulate that the timing of sexual activity is a key indicator of women's potential risk for pregnancy and childbearing. In addition, age at first sex marks the beginning of teenager's exposure to reproductive risks (ZIMSTAT and ICF International, 2012). Respondents reported to these questions: “How old were you when you had sexual intercourse for the very first time?” “When was the last time you had sexual intercourse?”

3.4.14. Socio-economic variables

3.4.14.1. Educational attainment

Education has been recognised in demographic literature as an important factor which influences women's childbearing patterns. It is a socio-economic variable which indirectly affects teenage fertility. Research conducted in sub-Saharan African countries and the rest of the world has shown that educational attainment can be used to explain variations in fertility rates (Gupta and Leite, 1999). This is because women who are enrolled in school have high chances of receiving sex education which helps them to make wise decisions regarding contraception hence indirectly impacting negatively on teenage fertility. Findings from nine Latin American DHS surveys shows that women with no education had large families of about 6 to 7 children compared to 2 to 3 children from women with better education (Martin and Juarez, 1995). As a result female education has become a crucial component of fertility analysis. The 2010-11 ZDHS has shown that total fertility rate for women who have no education was 4.5 births per woman which was lower than those with primary education 4.9 births per woman, however, fertility rate declined with the highest level of educational attainment that is 2.5 births per woman for females with more than secondary education (ZIMSTAT and ICF International, 2012). In relation to education, teenagers responded to several questions. Firstly they were asked if they have attended school and the responses to this question were close ended that is reported as yes or no. If the response was yes they were further asked the questions, "What is the highest level of school you attended? And what is the highest (grade/form/year) you completed at that level? The responses in the data were grouped into three categories which are primary, secondary and higher. In this study two educational categories were formed owing to small sample sizes namely; primary (no schooling plus primary) and higher (secondary plus higher).

3.4.14.2. Place of residence

It plays a vital role in determining sexual behaviour, the timing of marriage and childbearing as well as the children ever born to a woman during her reproductive life time. It has been argued that teenage girls who grew up in rural areas marry early compared to those who grew up in urban areas. As a result, rural teenagers will have a higher number of children ever born as they will be exposed to childbearing for many years compared to urban dweller teenagers who postpone marriage and childbearing (Senderowitz and Paxman, 1985). Hence urban teenagers have less years of being exposed to childbearing which reduces their fertility. This is mainly attributed to different socio-economic and cultural structures in these areas whereby

in rural areas, majority of the people are poor and cannot afford to educate their children especially girl children hence they encourage them to marry early because bride wealth is regarded as a source of income and wealth (Cohen, 1993; Mashamba and Robson, 2002). ZDHS 2010-11 showed that looking at all age specific birth rates, births to rural women at each age group are higher compared to that of urban women for example, for women in the age group 15-19 rural women had 144 births per 1000 women compared to 71 births per 1000 women for urban women in the same age group (ZIMSTAT and ICF International, 2012). As a result, TFR for women in rural area was 4.8 births per woman compared to 3.1 births per woman in urban areas and General Fertility Rate (GFR) was 172 per 1000 rural women compared to 115 per 1000 urban women (ZIMSTAT and ICF International, 2012).

In this study, place of residence is looked at in two ways that is urban and rural and according to the province in which teenagers live. Zimbabwe is divided into ten provinces and observing teenage fertility differences in province of residence is crucial in understanding the proximate determinants which are behind regional variations in teenage fertility. ZDHS collected data for each province and for rural and urban places from men and women between the ages 15-49 and this study focuses on the information for teenage girls aged 15-19.

3.4.14.3. Wealth Index

Wealth index is an important socio-economic variable which indirectly affects fertility. Wealth index was constructed using household asset data namely, ownership of consumer items such as bicycle or car, dwelling characteristics for example source of drinking water and sanitation facilities (ZIMSTAT and ICF International, 2012). In addition, rural-urban differences were also taken into consideration. In the ZDHS, wealth index is referred to as wealth quintile and it is categorised into lowest, second, middle, fourth and highest. In this study, wealth quintile is wealth index and instead of having five categories it is group into three categories namely, lower (lowest and second), middle and higher (fourth and highest).

3.4.15. Analysis approach

This research is quantitative and uses quantitative methods such as STATA. The first stage of analysis involves examining univariate analysis and bivariate relationships. Univariate analysis involves analysing one variable for descriptive purposes whereas bivariate analysis involves analysing two variables in order to determine the relationship that exists between them (Kohler and Kreuter, 2005). Following this, an examination of multiple logistic

regression method to analyse data obtained from formal instruments in this case the ZDHS is conducted. To analyse the timing of childbearing, Kaplan-Meier Survival estimator and Cox Proportional Hazard model are used. For this research, quantitative method was chosen because it allows for generalisation of the sample findings to the broader population (Cresswell, 1994).

3.4.16. Methods of analysis

3.4.16.1. STATA

STATA is a statistical package which allows new variables to be generated, data to be read, statistical analysis to be computed and graphs to be drawn. In addition, STATA enables one to define by-groups from one or more categorical variables to make it possible to conduct sophisticated data transformations using short and simple commands (Baun, 2006). A distinctive and most important feature of STATA is its ability to repeat over several variables for example when creating graphs (Kohler and Kreuter, 2005). STATA enables the creation of new commands which are different from official STATA commands. This is possible because do files in STATA enables one to define the new commands and the do file allows for viewing and modification of commands thereby demonstrating excellent programming practice (Baun, 2006). STATA's basic commands for data transformation are generate and replace. Generate creates a new variable with a name not currently in use and replace modifies an existing variable in STATA (Baun, 2006). Through the use of STATA version 12, different statistical methods were employed in this study and these are: multiple logistic regression model, Kaplan Meier survivorship curves and Cox Proportional Hazard models were.

3.4.16.2. Multiple Logistic regression method

Logistic regression models are used to ascertain the relationship between a dependent variable and a single or more independent variables (Kleinbaum, 2007). This study uses the multiple logistic regression model to investigate the relationship between teenage fertility (that is whether the teenager has given birth or not) and fertility determinants which are; age, marital status, contraception use, abortion, age at first sex, wealth index, educational attainment, place of residence (rural/urban) and province. As an important tool which is used to model the outcomes of a categorical variable, Logistic regression in this study is employed to model teenage fertility as a categorical dependent variable which is coded 0 if the respondent (teenager) never gave birth and 1 if the responded (teenager) gave birth. In

addition, Logistic regression enables one to determine the fitness of the model and the significance of the relationship between dependent and independent variables. Unlike ordinary regression, logistic regression estimates the probability of an event occurring.

Odds ratios from four Logistic regression models were reported. The first model estimated the effect of age and marital status on teenage fertility without controlling for other factors, the second model introduced contraception use, abortion and age at first sex. The third model controlled for wealth index and educational attainment as socio-economic variables and lastly, the fourth model introduced place of residence (rural/urban) and province. The logistic regression equation can be written as:

$$\log \frac{\pi_i}{1-\pi_i} = \log O_i = \alpha + \beta_1(X_1) + \beta_2(X_2) + \beta_3(X_3) + \beta_4(X_4) \quad 3.1$$

Where:

- $1 - \pi_i$ Represent the conditional probability of not having a child; π_i is the conditional probability of having a child.
- O_i is the conditional odds of not having a child.
- X represent independent variables (marital status, contraceptive use, abortion, age at first sex, educational attainment, wealth index, place of residence and province).

To interpret logistic regression using odds, antilogs were applied to equation 3.1 above to have the model as;

$$\frac{\pi}{1-\pi} = e^{\alpha+\beta} = e^{\alpha}(e^{\beta})^x \quad 3.2$$

Where: the two constants multiplied by each other to the power of x means that an additional determinant variable added on to the regression has a multiplicative effect on the odds of giving birth.

3.4.16.3. Survival Analysis methods

This study employed two survival analysis methods which are Kaplan Meier Survival estimator and Cox Proportional Hazard Model to examine the timing and determinants of

first childbearing. Kaplan Meier graphs and Cox proportional hazard model are statistical methods for analyzing the occurrence and timing of events (Lee and Wang, 2003). The occurrence and timing of events which is analyzed in this study is age at first birth. The only problem which is associated with questions on timing of the event occurring is that respondents may fail to recall the actual dates when they first encountered the event. In addition, the respondents might not have experienced the event being investigated at the time data was collected. As a result, respondents who have not experienced the target event become censored and this is one of Survival analysis's strength as it includes censored observations, that is taking into consideration the probability of the event occurring in the future since the event of interest will not have occurred to all respondents (Bewick, Cheek and Ball, 2004).

Survival analysis was used in this study to examine timing of childbearing with individuals represented as surviving until they give birth to their first child. The failure event was having a first birth between the ages 15-19 and censored events were individual teenagers who did not give birth in the same age group. In the ZDHS 2010-11, teenagers responded to the question have you ever given birth if yes, at what age. This study utilized the Kaplan Meier Survival estimator and Cox Proportional Hazard model to analyze survival data for age at first birth.

3.4.16.3.1. Kaplan Meier Survival estimator

This method is a non-parametric technique which is mainly used as a starting technique to estimate probability of an event occurring at a given time (Bewick *et al*, 2004). Kaplan Meier Survival estimator is applied to each independent variable hence it performs a univariate analysis. The Kaplan Meier Survival Estimator is written as:

$$S(x) = \prod_{\{y=0,x-1\}} P_y = \prod_{\{y=0,x-1\}} (1 - q_y) \quad 3.3$$

Where: S(x) is the estimated survival function

3.4.16.3.2. Cox Proportional Hazard Model

This is a technique that is used to determine hazard functions or the probability that an individual will experience a certain event within a particular time period given that the individual was subjected to the risk that the event might occur (Cox and Oakes, 1984). In this

study Cox Proportional Hazard Model is used to analyze relative risk of early childbearing at each teenage year given independent covariates that significantly influence early childbearing. This method is explained in terms of hazard functions and effect parameters. The hazard function gives a description of how hazards that is the risk of childbearing change over time. Effect parameters provide a description of how hazards relate to other factors. Cox Proportional Hazard includes both dependent and independent variables that are continuous, categorical and dichotomous (Cox, 1975).

Cox Proportional Hazard Model equation is written as:

$$h_i(t)/h_0(t) = \exp(\beta'(x_i - x_j)) \quad 3.4$$

Where: $h_i(t)$ is the hazard at time t

$h_0(t)$ is the baseline hazard when all the explanatory variables are equal to zero.

x_i, \dots are explanatory variables (Allison, 2012).

3.5. Summary of the chapter

This chapter discussed the Bongaarts (1972, 1982) proximate determinants of fertility as the theoretical framework of the study. The proximate determinants of fertility have been discussed briefly and these were divided by McDevitt *et al* (1996) into two categories namely exposure to intercourse and exposure to childbearing. Determinants which were discussed under exposure to intercourse are proportions married, age at first marriage, frequency of intercourse, extent of premarital intercourse and lactational infecundability. Under the category of exposure to childbearing, contraception and induced abortion were discussed. This research however, focused on age, age at first sex, age at first birth, marital status, contraception use and abortion as the proximate determinants of teenage fertility. Furthermore this study focused on socio-economic variables namely; educational attainment and wealth index, and geographical variables which are place of residence and province. The socio-economic variables and geographical variables indirectly influence teenage fertility. These proximate determinants of fertility were selected based on two criteria, the sensitivity of fertility to variations in the different intermediate variables and the extent of factors variability among populations over time. In addition, the chapter discussed the methodology which was used to analyse these determinants of fertility that is the dependent and independent variables of teenage fertility in Zimbabwe. The study used a descriptive survey,

the 2010-11 ZDHS which contains information on updated estimates of basic demographic and health indicators specifically maternal and child health. The data from this survey was used to determine how the proximate determinants of fertility impact on teenage fertility in Zimbabwe. This was achieved through the use of STATA, Multiple Logistic Regression method and the Survival Analysis methods which are Kaplan Meier Survival Estimator and Cox Proportional Hazard Model.

CHAPTER 4 RESULTS: DETERMINANTS OF TEENAGE CHILDBEARING

4.1. Introduction

This chapter is divided into two sections. The first section discusses determinants of teenage fertility using bivariate analysis and results from independent regression model. The second section presents the relationship and effects of proximate determinants on teenage fertility through the use of multiple Logistic regression models. This chapter analyses the relationship or the effects of proximate determinants of teenage fertility which are age, marital status, contraceptive use, abortion and age at first sex. The socio-economic determinants which are part of the analysis are educational attainment and wealth index. Furthermore, the geographical variables namely, place of residence (rural and urban) and province are also explored.

4.2. Bivariate analysis

4.2.1. Proximate determinants

4.2.1.1. Age

Table 4.1 below shows that the total sample size of the teenagers aged 15-19 in the period 2005-2011 was 3, 795. Through the use of independent logistic model which does not control for other influential determinants, odds of giving birth were tested and it was found that 32.41 percent (1230) of teenagers between the ages 15-19 gave birth in the period 2005 to 2011. The odds ratio of giving birth for this age group was found to be 1.34, signifying that as the age increases, teenagers have a 1.34 chance of giving birth. This shows that age is positively associated with teenage fertility. In addition, age was strongly statistical significant ($p0.000 < \alpha 0.05$). From these statistical results it is shown that without controlling for other variables, age can significantly predict the chances of giving birth during teenage years.

4.2.1.2. Marital status

It is presented in Table 4.1 below that there were 2,010 teenagers who never married and 1,785 teenagers who were married. Of all the teenagers who gave birth, 11.63 percent were never married while 88.37 percent were married. This shows that child bearing is more pronounced among married teenagers than among never married teenagers. The results support Swartz (2002) who found that, in almost all societies, fertility is directly related to marriage with married women giving birth more than never married women of the same age.

Table 4.1: Distribution of teenage females who gave birth by selected variables in Zimbabwe, 2005-2011

Explanatory Variable	N	Column percentage	Odds ratios of giving birth
Proximate determinants			
<i>Age</i>	3,795	32.41	1.34*
<i>Marital Status</i>			
(Never married)	2,010	11.63	
Married	1,785	88.37	20.33*
Total		100.00	
<i>Ever used Contraceptives</i>			
(No)	2,288	18.70	
Yes	1,507	81.30	17.65*
Total		100.00	
<i>Abortion</i>			
(No)	3,622	93.66	
Yes	173	6.34	1.76*
Total		100.00	
Socio-economic variables			
Wealth index			
(Low)	1,322	45.93	
Medium	1,490	41.06	0.69*
High	983	13.01	0.26*
Total		100.00	
Educational attainment			
(Primary)	864	37.40	
Higher	2,931	62.60	0.31*
Total		100.00	
Geographical variables			
Place of residence			
(Urban)	1,463	26.34	
Rural	2,332	73.66	2.23*
Total		100.00	
Province			
(Manicaland)	410	10.81	
Mashonaland Central	352	11.71	1.44*
Mashonaland East	337	10.49	1.29
Mashonaland West	388	12.76	1.42*
Matebeleland North	297	8.94	1.23
Matebeleland South	372	9.92	1.02
Midlands	422	12.60	1.21
Masvingo	334	9.27	1.08
Harare	483	7.48	0.49*
Bulawayo	400	6.02	0.47*
Total		100.00	

*significant at 0.05, *Note* omitted variables are in parenthesis.

The odds ratio of giving birth for married teenagers in Table 4.1 above was 20.33 times more than that of never married teenagers, indicating that, married teenagers were 20.33 times more likely to have given birth than never married teenagers. The results also confirm findings by Singh (1998) who argues that early childbearing in developing countries is more dominant among women who are in marriage. This is because married women in many societies, especially in the African society, are expected to prove their fertility once they got married. This shows that being married is strongly positively associated with giving birth and the results were strongly statistically significant ($p0.000 < \alpha 0.05$). Statistics from the independent regression model shows that marital status is a strong determinant of teenage fertility.

4.2.1.3. Contraceptive Use

In Table 4.1 above, teenagers who never used contraceptives were 2,288 and those who ever used contraceptives were 1,507. It is shown that, 18.70 percent of all the teenagers who gave birth never used any contraceptives whilst 81.30 percent used contraceptives. Teenagers who confirmed ever using contraceptives were 17.65 times more likely to have given birth compared to teenagers who reported never used contraceptives. These results contradict Bongaarts (1978, 1982) framework which is the theoretical framework of this study. Regarding the framework, Bongaarts (1978, 1982) argues that in any given population through the indirect influence of socio-economic variables, the use of contraceptives reduce childbearing and ultimately total fertility. The positive association between contraceptive use and teenage childbearing in this study might be attributed to the fact that teenagers who reported ever using contraceptives commenced using them after giving birth to their first child (Thomas and Maluccio, 1995). This is the case especially in Zimbabwe where teenagers who have never given birth and are never married, are deprived of contraception methods unless there is consent from the parent (Mashamba and Robson, 2002). As a result, contraceptive use only begins after teenagers have given birth or married which suppress the effect of contraception on fertility. In addition, PPD (2013) and WHO (2012) indicated that the prevalence of contraceptive use among teenagers in Zimbabwe was very low thereby suppressing the effects of contraceptive use on teenage childbearing. The results in Table 4.1 show a very strong positive association between contraceptive use and teenage fertility and were statistically strongly significant ($p 0.000 < \alpha 0.05$).

4.2.1.4. Abortion

In Table 4.1 above, it is presented that 3,622 teenagers never aborted and 173 teenagers reported having an abortion. Of all the teenagers who gave birth, 93.66 percent never aborted whereas 6.34 percent once had an abortion. Teenagers who had an abortion were 1.76 times more likely to have given birth compared to teenagers who have never aborted. This might be due to the fact that teenagers abort after having their first child as they feel that they have already proven their fertility, thus, they resort to abortion as a family planning method. In addition, teenagers in Zimbabwe become aware of safe abortion services only after giving birth, as such; teenagers tend to abort after their first child (Mashamba and Robson, 2002). The results show that there is a positive association between abortion and teenage fertility and they were significant ($p\ 0.001 < \alpha\ 0.05$). It is important to acknowledge that data on abortion in Zimbabwe might not be reliable as a result the sample size is too small for teenagers who reported having an abortion.

4.2.2. Socio-economic Variables

4.2.2.1. Educational attainment

It is presented in Table 4.1 above that there were 864 teenagers with primary education and 2,931 with higher education. 37.40 percent of all the teenagers who gave birth had primary education whilst the majority of teenagers who gave birth (62.60 percent) attained higher education. It is important to note that, these results are affected by smaller sample sizes among teenagers with primary education as many teenagers in Zimbabwe thrive to attain higher education. The odds of giving birth for teenagers with higher education were 0.31, showing a negative and strongly significant effect between higher education and childbearing ($p0.000 < \alpha\ 0.05$). This means that teenagers with higher education were 0.31 times less likely to have given birth than teenagers with primary education, meaning that, as educational attainment increases, the chances of giving birth during teenage years decrease. This might be attributed to the fact that teenagers with higher educational attainment spent more years in school and postponed childbearing as they perceived it as a hindrance to achieving their educational goals (Yavuz, 2010). These results are also in line with (WHO, 2012) findings of higher birth rates among teenagers with lower educational attainment as compared to those with higher educational attainment.

4.2.2.2. Wealth Index

1,322 teenagers were from lower income households while 1,490 teenagers were from middle income households as shown in Table 4.1 above. Teenagers who were from higher income households were 983. It is presented in Table 4.1 above that 45.93 percent of all the teenagers who gave birth were from low income households while 41.06 percent were from middle income households and only 13.01 percent were from higher income households. Compared to teenagers who were from lower income households, teenagers from middle income households were 0.31 times less likely to have given birth while teenagers from higher income households were 0.74 times less likely to give birth. The results show a negative and strongly significant effect for both teenagers from middle income and higher income households ($p < 0.000$ $< \alpha 0.05$). This indicates that as the wealth index of a household increases, the chances of giving birth during teenage years are reduced. This might be because teenagers from middle income and higher income households can afford to buy contraceptives and most of them reside in areas which are convenient in terms of accessing contraceptives compared to teenagers from lower income households. Many teenagers from lower income households reside in rural areas where they have to go to a local clinic and queue for free family planning services. Poor teenagers are discouraged to queue for family planning services as they fear to be seen by their relatives as a result they are most likely to engage in unprotected sex which exposes them to high risk of unwanted pregnancy and childbearing (WHO, 2006).

4.2.3. Geographical Variables

4.2.3.1. Place of residence

In Table 4.1 above, it is shown that many teenagers reside in rural areas of Zimbabwe with 2,332 teenagers living in rural areas compared to 1,463 teenagers in urban areas. 73.66 percent of all the teenagers who gave birth resided in rural areas whilst 26.34 percent resided in urban areas. Teenagers residing in rural areas were 2.23 times more likely to have given birth than teenagers residing in urban areas. In Zimbabwe, these results might be attributed to few youth family planning services which are not found in many deep rural areas as compared to urban areas where many youth family planning services are located. For example, the Bulawayo Youth Advisory Council and Youth Advisory Service which is located in Bulawayo an urbanised province (Boohene *et al*, 1991). The results show a

positive association between staying in rural areas and childbearing and were statistically strongly significant ($p\ 0.000 < \alpha\ 0.05$).

4.2.3.2. Province

Table 4.1 above shows that majority of teenagers resided in Harare (483); Midlands (422); Manicaland (410) and Bulawayo (400). Of all the teenagers who gave birth 12.76 percent resided in Mashonaland West, 12.60 percent in Midlands, 11.71 percent in Mashonaland Central, 10.81 percent in Manicaland and 10.49 percent in Mashonaland East and these provinces had highest percentages of teenagers who gave birth. Of all the teenagers who gave birth, least percentages were reported in Bulawayo and Harare with 6.02 percent and 7.48 percent respectively. Harare and Bulawayo are the urbanised cities in Zimbabwe and low percentages of teenagers who gave birth found in these provinces is attributed to availability of many youth family planning services for example Bulawayo youth Advisory Services and Youth Advisory Council. Matebeleland North is the province with highest poverty rates and also provinces such as Manicaland and Masvingo which are least productive areas in the country. In almost all the provinces except for Harare and Bulawayo, the majority of the population reside in rural areas where the cost of living is low as compared to urban areas.

Through the use of independent logistic regression, it was found that teenagers residing in Mashonaland Central were 1.44 times more likely to have given birth than teenagers staying in Manicaland. The results show a positive association and they were statistically significant at ($p0.02 < \alpha\ 0.05$). Compared to teenagers who live in Manicaland, teenagers residing in Mashonaland East were 1.29 times more likely to have given birth and the results were statistically insignificant. The likelihood of giving birth for teenagers who reside in Mashonaland West was 1.42 times more than that of teenagers in Manicaland showing a positive association and statistically significant results ($p0.02 < \alpha\ 0.05$). Similarly, the odds of giving birth for teenagers in Matebeleland North were 1.42. This means that by staying in Matebeleland North, teenagers had a 1.42 chance of giving birth than teenagers from Manicaland. Likewise, teenagers from Matebeleland South were found to be 1.02 times more likely to have given birth than teenagers who reside in Manicaland.

In addition, by the virtue of staying in Midlands teenagers had a 1.21 chance of giving birth compared to teenagers residing in Manicaland. The odds of giving birth for teenagers in Masvingo were 1.08, meaning that teenagers who were staying in Masvingo were 1.08 times more likely to have given birth than teenagers staying in Manicaland. Odds ratios for

teenagers who resided in Matebeleland North, Matebeleland South, Midlands and Masvingo were positively associated with giving birth. The likelihood of giving birth among teenagers residing in Harare was 0.51 times less than that of teenagers living in Manicaland indicating a negative association. Similarly, teenagers residing in Bulawayo were 0.53 times less likely to give birth than teenagers in Manicaland. The results for both Harare and Bulawayo were strongly significant ($p0.000 < \alpha 0.05$). The results were found to be statistically insignificant for Matebeleland North, Matebeleland south, Midlands and Masvingo (Odds Ratio ranging from 0.19 to 0.92 which are greater than 0.05).

Table 4.2 below shows multiple logistic regression models of the determinants of teenage childbearing in Zimbabwe, 2005-11. Model I tests the effect of age and marital status on teenage childbearing without controlling for other determinants. This is done to see the direct effect of age and marital status and to observe the direction of change when other determinants are introduced. It is shown in Model I that the age of teenage girls is positively and significantly associated with giving birth, with an odds ratio of 1.07. This means that as age increases, teenagers have a 1.07 chance of giving birth. The results are consistent with findings from ZRHS 1984 where more than one third of Zimbabwean teenagers gave birth at the ages 16, 17, 18 and 19 as compared to those aged 15 and below (Adamchak and Mbizvo, 1990; Boohene *et al*, 1991). The results in Model I show that teenage girls who were married had a higher chance of giving birth. This indicates a very strong positive and statistically significant association between marriage and teenage fertility. Teenage girls who were married were found to be 16.7 times more likely to have given birth than never married teenagers. The results confirm the finding that in many African countries marriage marks the official onset of childbearing because a child is expected soon after marriage (McDevitt *et al*, 1996; Singh, 1998). As a result, teenagers lack autonomy in decision making as they are supposed to live to the expectations of the society. Similar results were also found in Harare by Boohene *et al* (1991) where most adolescent childbearing took place within marriage. In South Africa and Namibia, marriage was found to have lost its value as a determinant of fertility because of high rate of teenage pregnancies among unmarried teenagers and insignificant differences between marital and non-marital fertility of African women (Nzimande, 2006; Indongo and Pazvakawambwa, 2012; Swartz, 2002; Chimere-Dan, 1999). Unlike South Africa and Namibia, marriage, specifically teenage marriage in Zimbabwe, has been found to be strongly significant in this study at $p < 0.05$.

Table 4.2: Nested Logistic regression models of the determinants of teenage fertility in Zimbabwe, 2005-2011

IV	Model I (=3,795)		Model II (N=3,795)		Model III (N=3,795)		Model IV (N=3,795)	
	OR	SE	OR	SE	OR	SE	OR	SE
Age	1.07***	0.19	0.92***	0.02	0.95***	0.02	0.95***	0.02
Marital Status (Never married)								
Married	16.70***	1.85	8.14 ***	1.04	6.35***	0.84	8.09***	1.18
Contraception (Never used)								
Using Contraception			7.57***	0.85	7.94***	0.92	7.95***	0.93
Abortion (Have not aborted)								
Have aborted			0.56***	0.10	0.52***	0.10	0.55***	0.10
Age at first sex			1.02***	0.01	1.02***	0.01	1.01***	0.01
Educational attainment (Primary)								
Higher					0.38***	0.04	0.38***	0.04
Wealth Index (Low)								
Medium					0.82	0.09	0.94	0.11
Higher					0.53***	0.07	0.71	0.13
Place of residence (Urban)								
Rural							1.25	0.20
Province (Manicaland)								
Mashonaland Central							1.00	0.20
Mashonaland East							1.31	0.27
Mashonaland West							1.44	0.29
Matebeleland North							2.00***	0.45
Matebeleland South							2.22***	0.47
Midlands							1.70***	0.34
Masvingo							0.93	0.19
Harare							0.99	0.23
Bulawayo							1.42	0.36
Log Likelihood	-1703.25		-1510.18		-1444.96		-1425.55	

***Significance at 0.05 level; IV = Independent Variable; OR = Odds Ratio; SE = Standard Error

Note: omitted categories are in parenthesis

In Model II, a measure of contraceptive usage, abortion and age at first sex as proximate determinants was introduced. After controlling for whether the teenagers have ever used contraceptives, aborted and engaged in sexual intercourse, the odds ratio of age declined slightly from 1.07 to 0.92, meaning that younger teenagers were less likely to have given birth compared to older teenagers. The results remained statistically significant at $p < 0.05$. The odds ratios for married teenagers remained positively and significantly associated with giving birth. The odds ratios sharply declined from 16.7 to 8.14 with the introduction of contraceptive usage, abortion and age at first sex. As such, the likelihood of giving birth for married teenagers was 8.14 times more than that of never married teenagers and the results were strongly significant at $p < 0.05$. The decline in the likelihood of giving birth for married teenagers after introducing these determinants indicate that even though the data does not allow for precise measurement of timing of contraceptive use and abortion relative to childbearing, these are still important predictors of childbearing. These results indicate that married teenagers start practicing contraception only after their first birth. This has been confirmed by Caldwell *et al* (1992) who reported that among married women, contraceptive usage between marriage and first birth is very minimal. In addition, contraceptive usage in Zimbabwe is high among married teenagers and the majority of married teenagers gave birth compared to never married teenagers as shown in Table 4.1. The results are consistent with findings by McDevitt *et al*, (1996) in sub-Saharan Africa, where contraceptive use was found to be high among married teenagers, 44.8 percent compared to about 42.9 percent of never married women in the same age group. This indicates that married teenagers use contraception methods more than never married teenagers probably because of higher chance to sexual engagement in marital unions.

Although married teenagers in Zimbabwe practice contraception more than never married teenagers, their inconsistent use of contraception, fewer abortions and high sexual engagement increased the risk of getting pregnant hence they were more likely to have given birth compared to never married teenagers as indicated by high odds ratios. The reason behind this is explained by Boohene and Dow (1987) who postulate that contraception in Zimbabwe was not used as a birth control method rather it was used primarily for birth spacing. High odds ratios of giving birth for married teenagers have also been supported by Swartz (2002) who indicates that, generally, in several societies married women have higher children compared to never married women of the same age, as a result, fertility is directly related to marriage.

Teenagers who ever used contraceptives were 7.57 times more likely to have given birth than teenagers who never used contraceptives. This shows a positive and significant association between contraceptive usage and childbearing at $p < 0.05$. The results contradict the theoretical framework of this study. Bongaarts (1978; 1982) Framework pinpoints contraception as one of the main proximate determinants which inhibit fertility. These results might be attributed to the fact that data does not allow for a more precise measurement of timing of contraceptive use relative to childbearing. This has also been acknowledged by Caldwell *et al*, (1992) who argues that in the DHS questionnaire, the question on ever use of contraception did not distinguish whether past use was before or after giving birth and marriage. Through the use of OLS regression models, Thomas and Maluccio (1995) found similar results in Zimbabwe using ZDHS 1988 data. Thomas and Maluccio (1995) found that, teenagers in Zimbabwe who were using contraceptives were 25 percent more likely to have given birth to a child in the last 12 months indicating that before having a child; teenagers in Zimbabwe do not use contraceptives. The results shown in Table 4.2 might be attributed to (WHO, 2006; 2012) findings of high birth rates among teenagers who used contraceptives owing to lack of knowledge on consistent use of contraceptives even after birth. In the case of Zimbabwe, teenagers are mainly exposed to a variety of contraception services after giving birth hence the effect of contraception usage on childbearing is suppressed (Mashamba and Robson, 2002). Similar arguments of high fertility rates among adolescents who ever used contraceptives were raised in South Africa. Camlin *et al* (2004) argue that low contraception use and high fertility among teenagers in South Africa is influenced by the desire to bear a child in order to prove their womanhood and barriers to access and lack of contraception knowledge. As such, teenagers were found to be least likely to have ever used contraception compared to other age groups in South Africa and this is also the case in Zimbabwe.

Abortion is the only proximate determinant which is negatively associated with giving birth in Model II. As has been expected and consistent with results from bivariate analysis in table 4.1, after controlling for other determinants teenagers who once aborted were 0.44 times less likely to have given birth than teenagers who reported that they never aborted. The results on abortion were statistically significant at $p < 0.05$. Teenagers who engaged in sexual intercourse during teenage years were found to be 1.02 times more likely to have given birth. This is because teenagers engage in unprotected sex the first time they encounter it due to lack of access and knowledge of contraceptive methods (WHO, 2012). As a result, unprotected sex exposes teenagers to high risks of unwanted pregnancy and childbearing (PPD, 2013).

Similar results were reported in rural KwaZulu-Natal where it was found that although the majority of teenagers were sexually active (60 percent) only 20 percent had ever used contraceptives (Camlin et al, 2004). Overall, Model II results show that age, marital status, contraception, abortion and age at first sex were strongly significant at $p < 0.05$.

The introduction of contraceptive usage, abortion and age at first sex in the regression equation in Model II made Model II to fit significantly better than Model I. This is shown by an increase in the log likelihood from -1703.25 to -1510.18, indicating that contraception, abortion and age at first sex are important determinants of teenage fertility.

In Model III, the introduction of educational attainment and wealth index as socio-economic determinants led to insignificant changes to the odds ratios for age. The odds ratios for age increased insignificantly from 0.92 in Model II to 0.95 in Model III. Like in Model II, age remained statistically significant after controlling for educational attainment and wealth index. The introduction of socio-economic determinants led to significant changes to the effect of marital status on teenage fertility. Odds ratios of giving birth for married teenagers significantly decreased from 8.14 in Model II to 6.35 in Model III after controlling for socio-economic determinants. This means that teenagers who were married were 6.35 times more likely to have given birth than never married teenagers. A decrease in the likelihood of giving birth for married teenagers after controlling for educational attainment and wealth index shows that educational attainment and wealth index have a depressing effect on childbearing behaviour of married teenagers. This is in line with the findings that, in sub-Saharan Africa, education is highly associated with a decrease in the proportions married at young ages as many teenagers postpone marriage to accomplish their educational goals (Van De Walle and Foster, 1990). In addition, married teenagers who have attained higher education and are from middle or higher income households make better decisions regarding contraceptive use and they can afford different types of contraception methods thereby reducing their likelihood of giving birth. In this study, educational attainment and wealth index were found to impact negatively on marital status and ultimately on teenage childbearing.

The odds ratios of giving birth by contraceptive usage increased slightly from 7.57 in Model II to 7.94 in Model III after controlling for educational attainment and wealth index. This means that teenagers who reported using contraceptives were 7.94 times more likely to have given birth than teenagers who reported never using contraceptives. The results were positively and significantly associated with childbearing. Similar to Model II, the results

contradicts Bongaarts (1978; 1982) framework which argues that socio-economic variables affects fertility indirectly through proximate determinants for example contraception. In this study the indirect effects of educational attainment and wealth index through contraception on fertility were not as expected. This might be attributed to the fact that in Zimbabwe, sex education was introduced but many parents criticised and rejected the idea as they thought that teenagers will become more promiscuous (Wilson, Greenspan and Wilson, 1989). As such, the education which is now provided in many schools does not empower teenagers in terms of contraception knowledge and use; hence educated teenagers know nothing or little about contraception (WHO, 2012). In addition, the results are a reflection of low contraceptive use among teenagers as explained by the findings that in sub-Saharan Africa, contraceptive prevalence is below 10 percent in 12 out of 22 countries (McDevitt *et al*, 1996). The increase in the likelihood of giving birth for teenagers who ever used contraceptives contradicts Trussell and Menken (1978) who argue that educated women use contraceptives effectively as hence education is an important predictor of contraceptive usage.

As indicated in Model II, abortion is the only determinant which shows expected association with childbearing after controlling for educational attainment and wealth index. Teenagers who have aborted were 0.48 times less likely to have given birth than teenagers who never aborted. Age at first sex remained constant after educational attainment and wealth index were introduced in the model. This shows that educational attainment and wealth index are not important predictors of childbearing by age at first sex.

Teenagers with higher educational attainment were 0.62 times less likely to have given birth than teenagers with primary education. This means that as teenagers spend more years in school they progress more to higher levels of education, thereby postponing childbearing. From the results it can be noted that, the more teenagers acquire higher education, the less likely they are to give birth. These results are consistent with Van De Walle and Foster (1990) findings of decreased childbearing among females who are more educated in sub-Saharan Africa. Similarly, it has been firmly established that, in Zimbabwe and Namibia, women's education has a depressing effect on fertility (Indongo and Pazvakawambwa, 2012; Kravdal, 2000). In addition, it was found that, in sub-Saharan Africa, fertility is negatively related with education (Cohen (1993). The same argument has been pinpointed by (WHO, 2012) when it indicated that, as teenagers spend more years in school they postpone childbearing thereby reducing birth rates among teenage women. Similarly, Yavuz (2010)

reinforced the argument that educational attainment of a teenage girl has a negative impact on childbearing because with higher educational attainment, teenagers tend to postpone marriage and childbearing. Contrary to these findings is a research which was conducted in 22 sub-Saharan countries where it was found that there were no significant effects of education on fertility in Zimbabwe, Malawi, Ghana, Burkina Faso and Uganda (Kravdal, 2002).

The likelihood of giving birth for teenagers from middle income households was 0.18 times less likely than teenagers from lower socio-economic households. This shows a strongly negative association between middle socio-economic households and teenage childbearing. Similarly, teenagers from higher income households were significantly 0.47 times less likely to have given birth than teenagers from lower socio-economic households showing a negative association. This may be attributed to the fact that teenagers from higher income and middle income households postpone childbearing and have access to various contraceptive methods (Singh, 1998). This is in line with Hogan and Kitagawa (1985) findings in the US where teenagers from poor families were found to have high fertility rates compared to teenagers from middle and higher income households as teenagers from low income households marry early and face financial constraints in accessing contraceptives.

Controlling for educational attainment and wealth index in Model III made it to fit significantly better compared to Model II. This is because with the introduction of socio-economic variables, the log likelihood increased from -1510.18 in Model II to 1444.96 in Model III. This indicates that the determinants in the regression equation in Model III are good predictors of childbearing.

In table 4.2, Model IV introduces geographical variables which are place of residence (rural and urban) and province in the model. The introduction of geographical variables did not change the odds ratios of age. Age remained negatively associated with giving birth when geographic variables were introduced. Controlling for geographical variables increased the odds ratio of giving birth among married teenagers from 6.35 to 8.09. This means that, after taking into account geographical variables, married teenagers were 8.09 times more likely to have given birth than never married teenagers. This might be attributed to the fact that probably the majority of teenagers who gave birth reside in the rural areas and poorest provinces of Zimbabwe where teenagers marry early before they become a liability to the family. This has been confirmed by (WHO, 2012) when it asserts that teenage births are more

likely to occur in poor, and less educated populations. These results show a strongly positive and statistically significant association at $p < 0.05$.

The odds of giving birth for teenagers who ever used contraceptives insignificantly increased from 7.94 in Model III to 7.95 in Model V. Similar to model 1II, contraception use was found to be strongly positively associated with giving birth and statistically significant at < 0.05 . As such, teenagers who ever used contraceptives were 7.95 times more likely to have given birth than teenagers who never used contraceptives. This supports findings by Adamchack and Mbizvo (1990) who, through the use of 1984 ZRHS and 1988 ZDHS found high fertility levels in poor and traditional areas of Zimbabwe as many teenagers face financial constraints in accessing contraceptives. With the introduction of geographical variables, abortion was found to be statistically significant at $p < 0.05$. Like in the previous Models, abortion in Model IV was found to be negatively associated with childbearing as teenagers who aborted were 0.45 times less likely to have given birth than teenagers who have never aborted. The odds ratios for age at first sex decreased insignificantly from 1.02 in Model III to 1.01 in Model IV after controlling for geographical variables.

The odds ratios for educational attainment remained the same after introducing geographical variables. Similar to Model III, teenagers with higher educational attainment were 0.62 times less likely to have given birth than teenagers with primary education. Teenagers who belong to middle socio-economic households were found to be 0.06 times less likely to have given birth than teenagers who were from lower income households. The results show a negative association and were found to be statistically insignificant at $p < 0.05$. Furthermore, teenagers who were from higher income households were 0.29 times less likely to have given birth compared to teenagers from low income households. This might be attributed to concentration of higher income households in urban settings and well developed richer provinces, which is why the effect becomes insignificant when geographical variables are controlled for.

In Model IV teenagers who reside in rural areas were found to be 1.25 times more likely to have given birth than teenagers who reside in urban areas. This is in line with the Government of Zimbabwe (1994) report which documented that rural teenage mothers were 22 percent compared to 15 percent teenage mothers in urban areas. These results support Cohen (1993) findings of higher fertility in rural areas than in urban areas in many African countries. This is attributed to low use of contraceptives among women in rural areas

(Thomas and Maluccio, 1995). On the other hand, these results contradict the findings of a study which was conducted in Lesotho where teenagers who resided in urban areas were found to be 1.4 times more likely to have given birth compared to teenagers in the rural areas (Makatjane, 2002). In addition, the likelihood of giving birth for teenagers in rural areas of Zimbabwe was found to be positively associated with teenage childbearing and statistically insignificant at $p < 0.05$.

The provinces which were found to have teenagers with high probabilities of giving birth than teenagers in Manicaland were Matebeleland South (2.22); Matebeleland North (2.00); Midlands (1.70); Mashonaland West (1.44); Bulawayo (1.42) and Mashonaland East (1.31). The results from these provinces were positively associated with teenage childbearing. Of these provinces with high odds ratios of giving birth, Matebeleland North, Matebeleland South and Midlands were found to be strongly statistically significant at $p < 0.05$. There were no differences in the likelihood of giving birth between teenagers from Manicaland and those who resided in Mashonaland Central (the odds ratios are equal to 1). The likelihood of giving birth for teenagers from Masvingo was 0.07 times less than that of teenagers from Manicaland. Compared to teenagers who reside in Manicaland, teenagers from Harare were 0.01 times less likely to have given birth than teenagers from Manicaland. Results for Mashonaland Central, Masvingo and Harare were statistically insignificant at $p < 0.05$.

Controlling for place of residence and province in Model V led to an increase in the log likelihood from -1447.96 in Model III to -1425.55 in Model IV making Model IV to significantly fit better than Model III.

4.3.0. Summary of the chapter

This chapter presented results of the likelihood of giving birth among teenagers by selected determinants. It was shown in Table 4.1 that 32.41 percent of 3,795 teenagers have ever given birth. Of all the teenagers who gave birth, 88.37 percent were married and only 11.63 percent were never married. In Table 4.1, teenagers who ever used contraceptives, once aborted, who reside in rural areas, from low income households and with primary education had higher chances of giving birth than their counterparts. From the nested logistic regression model in Table 4.2, age, being married, ever used contraception, once aborted, and age at first sex were statistically significant and strong predictors of childbearing in all the Models. Teenagers who came from medium and higher income households were less likely to have given birth than teenagers from lower income households. Higher income households were

found to be a strong determinant in Model III before the introduction of place of residence and province which made it insignificant in Model V. It is shown in Table 4.2 that educational attainment was statistically significant in both Models III and IV and having attained higher education resulted in less chances of giving birth. In model IV, rural and urban differentials were not significant but residing in rural areas was positively associated with giving birth. Living in Matebeleland North, Matebeleland South and Midlands was found to be positively associated with giving birth and results from these provinces were significant. The main determinants which were found to be significant in all Models are age, marital status, contraception use, abortion, age at first sex and educational attainment.

CHAPTER 5 RESULTS: DETERMINANTS OF AGE AT CHILDBEARING

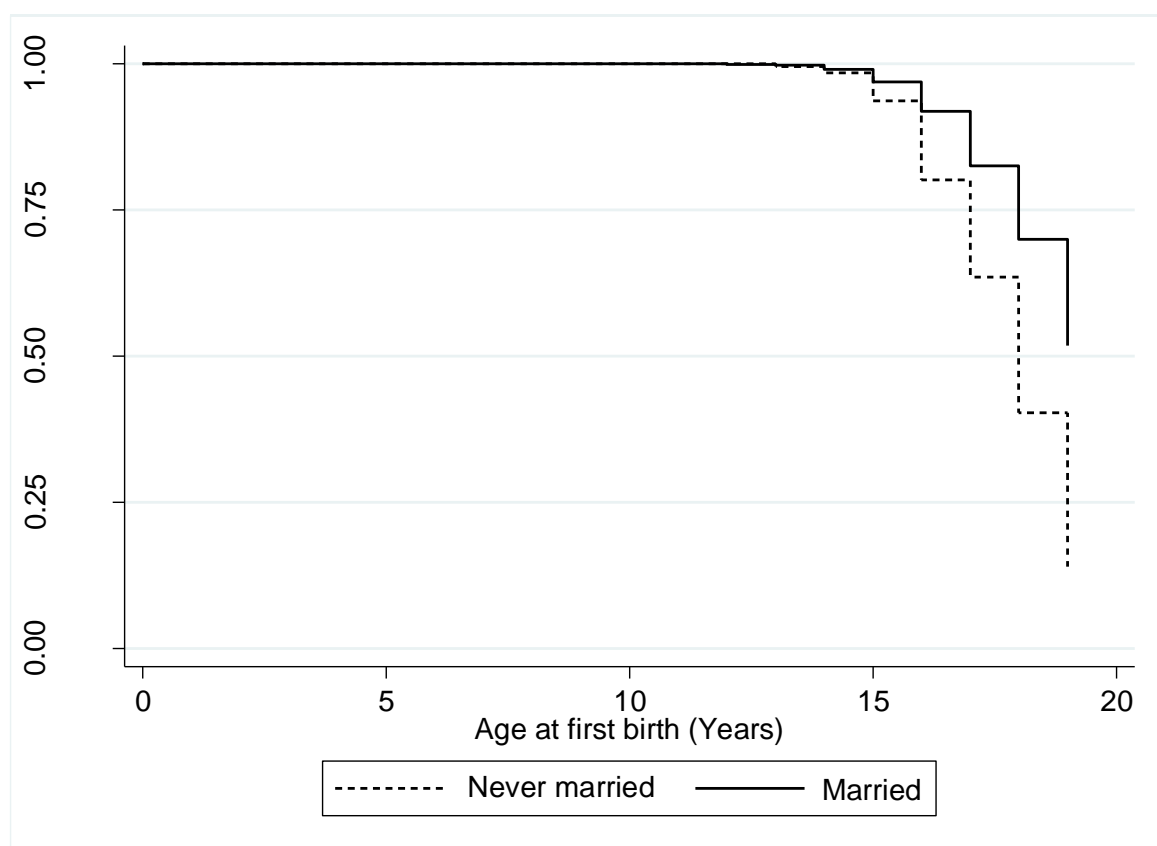
5.1. Introduction

This chapter presents results on age at first birth for teenage females using ZDHS 2010-11. This involves investigating and analysing the timing of first birth of teenagers measured by age at first birth through the use of two survival methods namely; Kaplan-Meier survival estimator and Cox proportional hazard model. Kaplan-Meier survival estimator is used to compare survival curves in two or more groups (Kleinbaum, Kupper, Nizam, & Muller, 2008). This chapter utilises survival analysis methods which differ from logistic regression models shown in chapter 4 in that, survival analysis focus on studying the time between entry to a study and a subsequent event (in this case childbearing). Using both logistic regression model and survival analysis methods in this study was very crucial because relying on logistic regression model only would not allow accounting for a variable which measures the time from which a teenager was included in the study to occurrence of the event or censoring. For this reason, relying only on logistic regression model was not adequate and an alternative technique was used, which is the Cox proportional hazard model. Thus, unlike logistic regression model presented in chapter 4, Cox proportional hazard model examines the time to an event in order to account for censoring and assessing the relationship between covariates and survival time (Kleinbaum *et al*, 2008). Cox proportional hazard model is important as it allowed for assessment of effects of multiple covariates on survival thus it helps to distinguish individual contributions of covariates on survival. Since childbearing is affected by many covariates, Cox proportional hazard models are used to analyse the effect of several risk factors on survival.

Figure 5.1 below shows that no teenager had a first birth before the age of 12. After the age of 12, there are noticeable differences on the age at first birth between teenagers who were never married and those who were married. From the age of 15 to the age of 16, it is clearly shown that teenagers who were never married had higher probabilities of having a first birth compared to married teenagers and this trend is observed at all the ages. In support of the results, Trussell and Menken (1978) found that many teenagers had their first births out of wedlock and these births were recorded as premarital births even though this usually results in marriage of the teenage mother. Furthermore, Singh (1998) and United Nations (1995) have shown that young never married teenagers are considered to be at a higher risk of giving birth compared to married teenagers. Higher probabilities of having a first birth for never

married teenagers in Figure 5.1 below are consistent with the finding that in sub-Saharan Africa and in some Latin American countries, contraception prevalence is lower among never married teenagers compared to married teenagers hence never married teenagers are at higher risk of childbearing (McDevitt *et al*, 1996). This might be attributed to the fact that teenagers postpone marriage hence the percentage of teenagers who were married was small and also never married teenagers in Zimbabwe and other African countries face constraints in accessing contraceptives thereby exposing them to higher risk of first birth.

Figure 5.1: Kaplan-Meier survivorship for age at first birth by marital status among teenage females, 2005-2011.



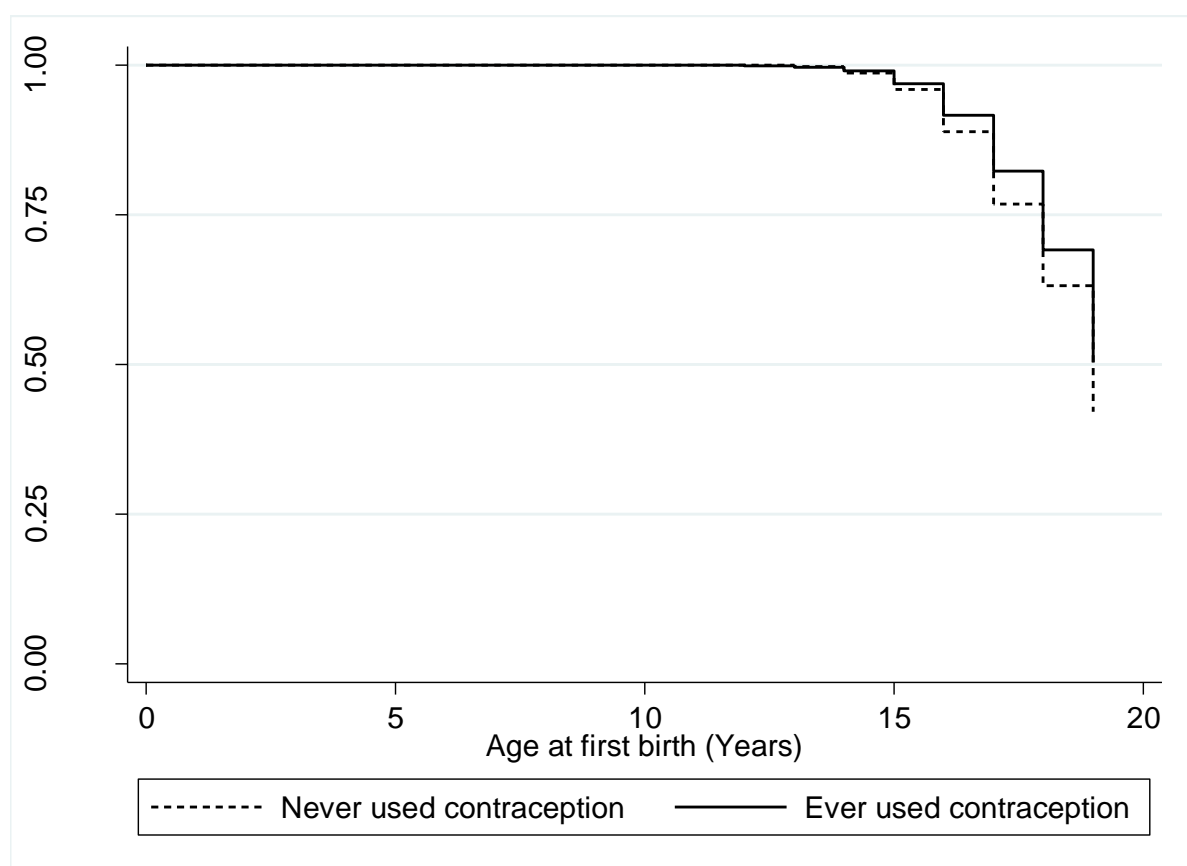
At the age of 16 in Figure 5.1 above, the probabilities of having a first birth for both never married and married teenagers converged. From the age of 16 to the age of 19 the differences in the survivorship probabilities of first birth widens showing that never married teenagers were associated with higher probabilities of first birth compared to married teenagers. The results are in consistent with Hoffman and Maynard (2008) who indicate that 72 percent of teen births are out of wedlock and about three quarters of the teenagers are giving birth for

the first time. Similarly, premarital births have been reported to have increased in Africa (Bledsoe and Cohen, 1993; Lesthaeghe and Jolly, 1995 and Gage, 1998; Trussell and Menken, 1978). Similar findings were confirmed by Bledsoe and Cohen (1993) in ten out of 20 sub-Saharan countries where an increase in premarital births as a percentage of all adolescent births was noticed. It is clearly shown in Table 5.1 above that the probabilities of first birth for married teenagers end slightly before survivorship probabilities of 0.50 whereas never married teenagers remained exposed to the risk of giving birth until they reach survivorship probabilities of approximately 0.13. On the other hand, the results contradict McDevitt *et al* (1996) who argues that exposure to childbearing is less for never married adolescents as compared to married adolescents. Similar contradictory results of declining premarital fertility in Zimbabwe were reinforced by Harwood-Lejeune (2001).

In Figure 5.2 below, it is shown that before the age of 12, teenagers never had a first birth owing to their biological immaturity to give birth. Differences in the probabilities of having a first birth by contraceptive use are noticed after the age of 12. Almost similar survivorship probabilities were observed for teenagers who never used contraception and those who ever used contraceptives from age 13 to age 15. From the age of 15 to the age of 16, teenagers who never used contraceptives had slightly higher probabilities of first birth than teenagers who ever used contraceptives. At the age of 17 the gap between the probabilities of having a first birth widened with teenagers who have never used contraceptives having higher probabilities of first birth than teenagers who once used contraceptives, a similar pattern is observed at all ages. This might be because teenagers rarely use contraceptives before having their first child which increases their risk of having a first birth. Furthermore, in Zimbabwe, contraceptive use is high among married teenagers as never married teenagers are not allowed to access contraception services unless they are married or accompanied by their parents (Mashamba and Robson, 2002). Although contraception knowledge has been reported to be high in Zimbabwe with at least 90 percent of teenagers being familiar with contraception knowledge, availability and accessibility of contraceptives for teenagers is a huge problem (Caldwell *et al*, 1992; Blanc and Way, 1998; WHO, 2012). As a result, high probabilities of giving birth for teenagers who never used contraceptives is attributed to unmet contraception needs of never married teenagers and low use of contraceptives by teenagers (Maharaj, 2001; PPD, 2013; WHO, 2012). Low contraception use by never married teenagers is attributed to lack of knowledge and fear of side effects and in Zimbabwe this is the case especially for teenagers who reside in rural areas thereby exposing them to high risk

of giving birth (Bongaarts and Bruce, 1995). Of importance is, teenagers who turned 19 who never used contraceptives survived more without having a first birth than 19 year old teenagers who ever used contraceptives as shown in Figure 5.2 below. Teenagers who ever used contraceptives their survivorship probabilities ended at 0.50 whereas teenagers who never used contraceptives their survivorship probabilities continued to about 0.40. This indicates that teenagers who never used contraceptives are exposed for a long time to the risk of having a first birth compared to teenagers who ever used contraceptives.

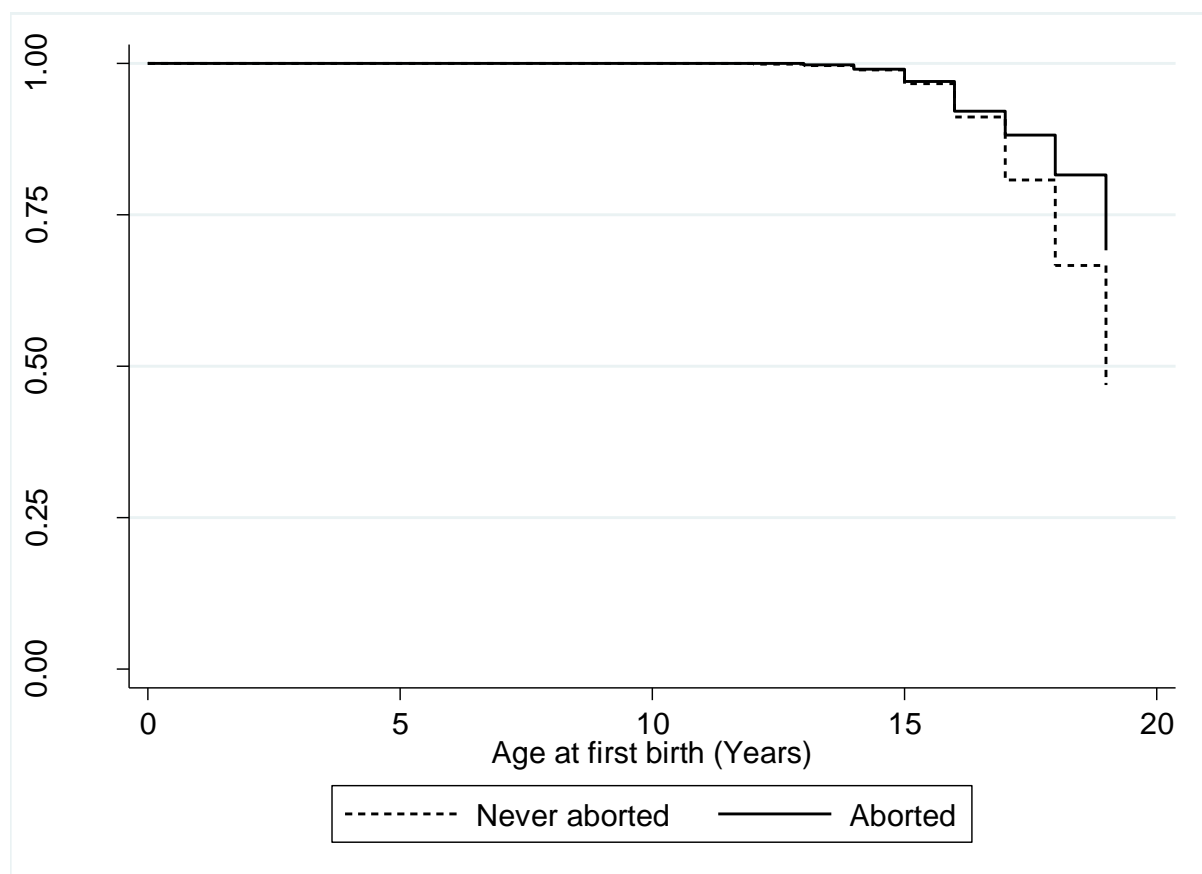
Figure 5.2: Kaplan-Meier survivorship probabilities for age at first birth by contraceptive use among teenage females, 2005-2011



Before the age of 12, teenagers never had a child but differences in probabilities of having a first birth by abortion are depicted thereafter in Figure 5.3 below. From the age of 13 to about the age of 16, teenagers who never aborted and those who aborted had almost the same probabilities of having a first birth. At the age of 17 teenagers who never aborted experienced higher probabilities of giving birth than teenagers who once aborted and the same is observed at the age of 18. It is presented in Figure 5.3 below that that from the age of 17 to the age of 19, teenagers who had never aborted had higher probabilities of first birth compared to

teenagers who once aborted. In addition, teenagers who had never aborted had prolonged time to first birth after the age of 18 compared to teenagers who have aborted. Lower probabilities of having first birth which is shown for teenagers who once aborted might be attributed to the notion that abortion does not lead to a live birth as such teenagers who never aborted experienced a live birth (Singh, 1998).

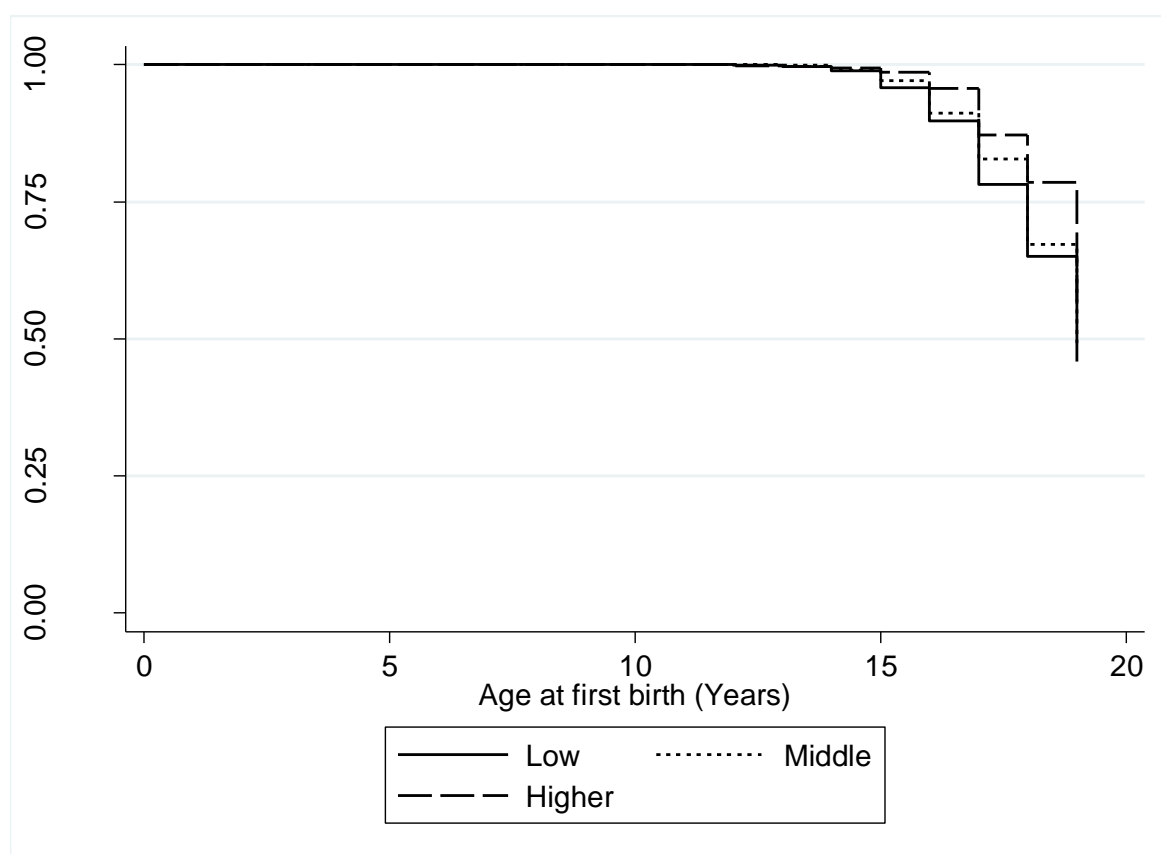
Figure 5.3: Kaplan-Meier survivorship probabilities for age at first birth by abortion among female teenagers, 2005-2011



Survivorship probabilities for age at first birth by wealth index for teenage females aged 15-19 are presented in Figure 5.4 below. It is shown that no teenager had a first birth before the age of 12. From the age of 13 to about the age of 15 teenagers from lower, middle and higher income households experienced almost the same probabilities of having a first birth. From the age of 16 to the age of 17 teenagers from lower income households had higher probabilities of having a first child followed by teenagers who were from middle income households and teenagers from higher income households had the lowest probabilities of having a first birth. The same pattern is observed at all the ages. This confirms the findings that teenagers from lower income households were more likely to give birth in the United

States as they could not afford contraception (Santelli and Melnikas, 2010). It is clearly shown in Figure 5.4 below that, teenagers who were from higher income households were not highly exposed to the risk of having a first child compared to teenagers from poor and middle income households.

Figure 5.4: Kaplan-Meier survivorship probabilities for age at first birth by wealth index for teenage females, 2005-2011



In Table 5.1 below, Model I looks at the effects of age and marital status on timing of teenage childbearing. The age of teenage girls is associated with a low hazard rate of giving birth indicating that younger teenagers are associated with improved survival to childbearing and the results have a strongly statistically significant effect on teenage fertility. Married teenagers had a higher hazard ratio of first birth than never married teenagers meaning that being married as a teenager is associated with increased risk of giving birth. This is supported by Singh (1998) who asserts that in many developing countries early childbearing commences in marriage as teenagers are socially expected to start their reproductive lives. As a result married teenagers have higher exposure to childbearing compared to never married teenagers (McDevitt *et al*, 1996). The results had an insignificant effect on childbearing.

Table 5.1: Cox Proportional Hazard Model of the determinants of teenage fertility, 2005-2011

IV	Model I (N=3,795)		Model II (N=3,795)		Model III (N=3,795)	
	HR	SE	HR	SE	HR	SE
Age	0.90***	0.01	0.90 * **	0.01	0.90***	0.01
Marital Status (Never married)						
Married	1.10	0.10	1.10	0.10	1.07	0.10
Contraceptive (Never used contraception)						
Used contraception			1.06	0.08	1.09	0.08
Abortion (Have not aborted)						
Have aborted			1.11	0.13	1.09	0.13
Age at first sex			0.99***	0.00	0.99***	0.00
Educational attainment (Primary)						
Higher					0.71***	0.04
Wealth Index (Low)						
Middle					1.01	0.06
Higher					0.90	0.08
Log likelihood	-7968.52		-7963.26		-7945.00	

*** Significant at 0.05; IV = Independent Variable; HR= Hazard Ratios; SE= Standard Error

Note: omitted variables are in parenthesis

Contraceptive usage, abortion and age at first sex as proximate determinants were introduced in Model II. The introduction of these determinants did not cause any changes to the effect of age in the hazard ratios of childbearing meaning that younger teenagers have lower hazard ratios of childbearing compared to older teenagers. The effect of age on teenage childbearing remained strongly significant after controlling for contraceptive usage, abortion and age at first sex. The introduction of contraceptive usage, abortion and age at first sex did not change the effect of marital status on childbearing. Married teenagers remained having a higher hazard ratio of childbearing than never married teenagers. This is attributed to the notion that married teenagers in Zimbabwe access contraception services after their first birth as a birth spacing method thereby suppressing the effects of contraceptive use and abortion (Mashamba and Robson, 2002). This is explained by McDevitt *et al* (1996) who indicate that in many countries and Zimbabwe is no exception, the use of contraception services by married teenagers is very minimal as they are expected to prove their fertility hence, levels of contraception use among married teenagers are low. As a result, even though married teenagers can access contraception services without being stigmatised, the effect of contraception on teenage marital childbearing is less significant thereby maintaining higher hazard ratios for married teenagers than never married teenagers. Similarly, the fact that hazard ratios for married teenagers did not change is attributed to fewer performance of abortion by teenagers (Singh, 1998). These findings are also in line with the results from multiple Logistic regression models in Table 4.2 in Chapter 4, where married teenagers were found to have higher odds ratios of giving birth compared to never married teenagers. In addition, higher hazard ratios of giving birth for married teenagers is attributed to high unprotected sexual engagement in marriage which exposes them to the risk of childbearing (WHO, 2006). As a result, being married was associated with higher hazard ratios of childbearing compared to their counterparts.

Similar to results shown in multiple logistic regression models in chapter 4, it is shown in Model II that teenagers who ever used contraceptives had higher hazard ratios than teenagers who never used contraceptives and the results are statistically insignificant. Although the results contradicts the theoretical framework of this study probably due to insufficient data on timing of contraception relative to childbearing, previous studies found similar results. The results are consistent with the findings from a study conducted in Zimbabwe, where teenagers who used contraception were found to be 25 percent more likely to have given birth compared to never married teenagers (Thomas and Maluccio, 1995). Similarly, teenagers

who aborted had higher hazard ratios of giving birth compared to teenagers who never aborted. This is also attributed to the fact that teenagers start practising contraception after their first child and abortion will be used as a family planning method thereby suppressing the effects of abortion on teenage childbearing. Age at first sex is the only determinant which is associated with lower risks of childbearing at younger ages as the hazard ratios are below 1 and the results were statistically significant.

Model III introduces the measure of socio-economic variables which are educational attainment and wealth index to control for the different effects in wealth accumulation and educational attainment on hazard ratios of childbearing. Similar to Model II, controlling for wealth index and educational attainment did not cause any changes to the effect of age in the hazard ratios of childbearing meaning that younger teenagers have a lower hazard of childbearing compared to older teenagers. These results were statistically significant. Socio-economic determinants caused slight changes to the effect of marital status on childbearing. The hazard ratios of childbearing for married teenagers decreased slightly from 1.10 to 1.07. This indicates that educational attainment and wealth index are important variables in explaining differentials in childbearing by marital status. This means that after controlling for socio-economic determinants, married teenagers still had a higher risk of childbearing compared to never married teenagers and the results were insignificant. This might be attributed to (WHO, 2012) argument that many married teenagers spent few years in school hence, they are less educated, they come from poor households and from rural areas where early marriage and childbearing is acceptable. In such an environment married teenagers do not make their own decisions as they are faced with financial problems which hinder their mobility to seek for birth control methods (WHO; 2006). As a result, educational attainment and wealth index did not have significant effects on the childbearing behaviour of married teenagers. The introduction of wealth index and educational attainment increased slightly the effects of contraceptive usage on the hazard ratios of childbearing. Teenagers who used contraceptives had higher hazard ratios of childbearing than teenagers who never used contraceptives and the results were statistically insignificant. High hazard ratios among teenagers who ever used contraceptives is probably attributed to the fact that, teenagers regardless of their socio-economic status, start using contraceptives after giving birth and they lack sex education especially on consistent use of contraceptives. Similar to Model II, in Model III teenagers who aborted had higher hazard ratios of giving birth than teenagers who never aborted. Age at first sex remained constant with the introduction of socio-economic

variables in the model. Age at first sex was associated with a lower risk of giving birth and the results were statistically significant.

As has been expected and consistent with results from logistic regression in Table 4.1 and 4.2, teenagers with higher educational attainment had lower hazard ratios of giving birth compared to teenagers with primary education and the results were also statistically significant. The results confirm the argument that, education is a major protective factor for early childbearing with more years spent in school resulting in decreased births (WHO, 2012). Similarly, the results support the finding that teenagers with secondary education have fertility rates which are less than one third of the teenagers who are less educated or are not educated at all (Singh, 1998). Lower hazard ratios for teenagers with higher educational attainment compared to teenagers with primary education confirms a study by Yavuz (2010) who argues that the higher the educational level attained by teenagers, the less likely teenagers are to give birth. As a result, education contributes more to adolescent fertility decline because educated women have lower levels of adolescent childbearing and changes in educational composition account for a reduction in several percentage points in the proportion of females who give birth before the age of 20 (Singh, 1998). On a similar notion, Cochrane, 1979 cited in Palamuleni, Kalule-Sabiti and Makiwane (2007) asserts that as women progress in education, they usually postpone marriage resulting in a negative effect on fertility. Cohen (1993) confirms these findings by indicating that in sub-Saharan Africa, fertility is negatively related with higher educational attainment.

Teenagers from middle income households had higher hazard ratios of childbearing than teenagers from lower income households; however this effect was statistically insignificant. On the other hand, teenagers from higher income households had lower hazard ratios of childbearing compared to teenagers from lower income households but this too was statistically insignificant. Lower hazard ratios for teenagers from rich households compared to teenagers from poor households are a result of different accessibility and affordability of contraception services as teenagers who are from rich households can afford to buy contraceptives thereby reducing their risk of childbearing. In addition, most of teenagers from rich households live in urban areas where a variety of contraception providers are situated thereby reducing their hazard ratios compared to that of teenagers from poor households. Overall, in Model III age, age at sexual intercourse and educational attainment were found to be statistically significant.

5.2. Summary of the chapter

Results from two survival methods namely, Kaplan-Meier survival estimator and Cox proportional regression model on determinants of age at first birth and teenage childbearing using 2010-11 ZDHS were presented in this chapter. Kaplan Meier survival estimator was used to analyse age at first birth by marital status, contraceptive usage, abortion, educational attainment and wealth index. It was established that teenagers who were never married, who never used contraceptives, who never aborted and who were from low income households were found to have high probabilities of giving birth at all the ages. It is important to note that results from Kaplan Meier survival estimator except for wealth index differ from Cox proportional hazard model results because in the later model, age was controlled for thereby affecting the results of the major determinants. In Cox model similar to Kaplan Meier survival estimator, it was established that teenage childbearing varies by age, marital status, contraceptive use, abortion, age at first sex, educational attainment and wealth index. Results from Cox proportional hazard model showed that the age of teenage girls, age at first sex, higher educational attainment and being from a higher income household was associated with low hazard ratios of giving birth. In Cox proportional hazard models, the most significant determinants of childbearing during teenage years were found to be age, higher educational attainment, and age at first sex.

CHAPTER 6: DISCUSSION, RECOMENDATIONS AND CONLUSION

6.1. Introduction

The study was set out to investigate the proximate determinants of teenage fertility in Zimbabwe using data from ZDHS 2010-11. The proximate determinants investigated in this study were age, marital status, contraception, abortion and age at first sex. In addition, indirect determinants of fertility such as educational attainment, wealth index, place of residence and province were explored. The general literature on proximate determinants of teenage fertility in the African context and particularly Zimbabwean context is inconclusive especially on the determinants which affect teenage fertility. As a result, this study sought to describe the levels and trends of teenage fertility in Zimbabwe from the year 1988 to 2011. In addition, the study sought to investigate the main determinants of the likelihood of teenage fertility and the timing of this event in Zimbabwe through the use of multiple Logistic regression model, Kaplan Meier Survival estimator and Cox Proportional Hazard model. This study achieved to answer all the research questions as presented in chapter 4 and 5 and as shown in the discussion of the main findings. The main findings on the determinants of teenage fertility are discussed in this chapter. The chapter suggests some recommendations based on the discussion and ends with a conclusion of the chapter.

6.2. Discussion of empirical findings and theoretical implication

Teenage fertility has been documented to be increasing in sub-Saharan Africa and it remained higher in comparison to other regions (McDevitt *et al* (1996). The increase in teenage fertility has been attributed to an increase in teenage premarital fertility in many countries (Lesthaeghe and Jolly, 1995; Bledsoe and Cohen, 1993; Nzimande, 2006). This is consistent with results from Kaplan Meier survivorship probabilities in this study where never married teenagers were found to have higher chances of giving birth early at all the ages than married teenagers. The majority of teenage births occur out of wedlock and in Zimbabwe once a teenager gives birth, this is often followed by marriage (McGrath *et al*, 2009). A study conducted by Harwood-Lejeune (2001) showed that premarital births were very high with highest births reported in Namibia, Kenya and Zimbabwe and lowest were recorded in Malawi. However, a trend towards a decline in premarital births in Zimbabwe was found through the use of 1994 ZDHS (Harwood-Lejeune, 2001).

In Zimbabwe, teenage fertility rate has been reported to be declining although it is still high by international standards and high relative to developed and some developing countries.

Births to teenagers aged 15-19 were 102 per 1000 teenagers in 1988, the number slightly decreased to 99 births per 1000 teenagers in 1994 (ZIMSTAT and ICF International, 2012). A sharp increase from 99 births per 1000 teenagers to 112 births per 1000 teenagers was recorded from the period 1994 to 1999 and significantly dropped by the same rate to 99 births per 1000 teenagers in 2005-06 (ZIMSTAT and ICF International, 2012). From the period 2005-06 to 2010-11 a sharp rise in births were reported at 115 births per 1000 teenagers.

This study established that three proximate determinants contributed significantly to increased teenage fertility in Zimbabwe. Marital status, contraceptive use and age at first sex were the main proximate determinants which were found to be positively related to teenage fertility. Of the 1230 teenagers who gave birth it was found that 88.37 percent were married whilst 11.63 percent were never married, indicating that childbearing is more pronounced in marriages. Without controlling for other proximate determinants, socio-economic variables and geographical variables, married teenagers were found to be 16.70 times more likely to have given birth than never married teenagers. The results confirm the finding that married teenagers give birth early in accordance with social norms (WHO, 2012; McDevitt *et al*, 1996; Singh, 1998). It is mainly an African culture that once women get married, the society expects them to prove their fertility soon after that. As a result, married women give birth early in conformation with society's expectations. In support of these findings, Caldwell *et al* (1992) in their study found that, married teenagers are less likely to use contraception between marriage and first birth hence their chances of giving birth are higher compared to never married teenagers. On a similar line of reasoning, Swartz (2002) found that in many societies, fertility is directly related to marriage with married women giving birth more than unmarried women of the same age. Thus, the findings of this study confirm evidence from previous research conducted in sub-Saharan Africa of a positive association between marital status and teenage childbearing.

After controlling for contraceptive usage, abortion and age at first sex, the likelihood of giving birth for married teenagers decreased sharply from 16.70 to 8.14 indicating the importance of contraceptive usage and abortion as fertility inhibitors among married teenagers. This is in line with Bongaarts (1978; 1982) framework which indicates that contraception is the main determinant responsible for fertility variations in marriages. The positive relationship which remains even after controlling for contraceptive use, abortion and age at first sex is explained by the environments in which teenagers are married in. Married

teenagers lack autonomy in decision making, finance and mobility to seek contraception as a result, they have little knowledge regarding birth control services even after giving birth (WHO, 2006). Thus, married teenagers are exposed to high sexual intercourse without proper birth control methods which exposes them to high risk of childbearing. This study found that marital status is main proximate variable which is contributing more to an increase in teenage childbearing. It is vital to note that marital status in Cox proportional hazard model was found to be insignificant but the direction of the effect is the same as in multiple logistic regression models.

The second proximate determinant which was positively linked to teenage fertility is contraceptive usage. Teenagers who ever used contraceptives were more likely to give birth than teenagers who never used contraceptives. This contradicts the theoretical framework of this study which pinpoints contraception as a major proximate determinant which inhibits fertility (Bongaarts, 1978; 1982). This might be attributed to the fact that data does not allow for a more precise measurement of timing of contraceptive use relative to childbearing. The same results were found in Zimbabwe by Thomas and Maluccio (1995) where teenagers who used contraceptives were found to be 25 percent more likely to have given birth. The positive relationship between contraceptive usage and teenage childbearing is attributed to the notion that teenagers usually commence using contraceptives after having their first child as a birth spacing method. This is consistent with findings from studies conducted in Zimbabwe, South Africa and sub-Saharan Africa where it was found that there is an unmet need of contraception for teenagers as they are not allowed to access contraceptives outside marriage thereby exposing them to high risks of pregnancy and childbearing (Mashamba and Robson, 2002; Maharaj, 2001; Alli *et al*, 2013; Camlin *et al*, 2004; McDevitt *et al*, 1996; WHO; 2012; 2006). The findings also support a study conducted in Zimbabwe by Adamchak and Mbizvo (1990) using the 1984 ZRHS and 1988 ZDHS where it was found that fertility levels were very high regardless of high contraception knowledge among teenagers. Similarly, Blanc and Way (1998) found that, in Zimbabwe, contraception knowledge was very high with at least 90 percent of teenagers knowing some contraception methods but teenagers lack access to the family planning services. According to PPD (2013) findings, there is low contraceptive prevalence of about 36 percent among teenagers in Zimbabwe. The same results were reported by Calim *et al* (2004) who found that in South Africa, high teenage fertility is attributed to low contraceptive usage among teenagers as compared to all age groups. This also confirm findings that teenagers in many African countries are well aware of

contraception methods the problem is accessibility and availability of family planning services which creates a gap between contraception knowledge and use (Maharaj, 2001). Similar to marital status, contraceptive use was found to be insignificant in Cox proportional hazard model but the direction of effect was similar in both multiple logistic models and Cox proportional hazard models.

Age at first sex is the third proximate determinant which was positively linked to teenage childbearing in this study. Early sexual initiation among teenagers exposes them to high risk of pregnancy and childbearing. This confirms findings in sub-Saharan Africa where teenage childbearing is attributed to high voluntary sexual activity by the majority of teenagers with approximately 75 percent of teenagers having had at least one sexual intercourse by the age of 20 (Blum, 2007 cited in Prata *et al*, 2012).

Of importance and as has been expected from the theoretical framework of this study, abortion was found to be a strong proximate determinant which led to a reduction in teenage childbearing. Even after taking into consideration socio-economic and geographical variables, abortion remained negatively related to teenage childbearing. Similar results were found in the United States where access to abortion services was found to be one of the factors which contributed to a decline in teenage fertility (Guldi, 2008). Likewise, in Romania abortion was found to be the main birth control in the 1960s and it led to a sharp decline in fertility (Teitelbaum, 1972). In the previous studies for example Sklar and Berkov (1974); Angrist and Evans (1996); Levine *et al* (1999) they found that legalized abortion led to a decrease in teen birth-rate by 2 percent to 13 percent.

The assertion that the more people become educated, the more likely they are to postpone childbearing has been confirmed in this study. Educational attainment as a socio-economic variable was found to have indirect and negative effects on teenage childbearing and this is line with the theoretical framework of this study. In all the models, educational attainment was found to be negatively and significantly associated with teenage childbearing. Teenagers who were more educated were found to be less likely to give birth compared to teenagers with primary education. This has been reinforced by WHO (2012) when it argues that education is a major protective factor for early childbearing because as teenagers spend more time in school, they postpone childbearing as they view it as a hindrance to attaining their educational goals. Studies which were conducted in Zimbabwe and Namibia found that women's education has a significant depressing impact on fertility especially among

teenagers (Thomas and Maluccio, 1995; Indongo and Pazvakawambwa, 2012). Findings from nine Latin American DHS surveys showed that women with no education had large families of about 6 to 7 children compared to 2 to 3 children from women with better education (Martin and Juarez, 1995). Through the use of time hazard models to estimate the probability of women having a first birth during adolescent years, it was found that educational level was the main and consistent factor associated with low probabilities of giving birth during teenage years (Gupta and Leite, 1999). It was confirmed in this study that teenagers from middle and higher income households were less likely to have given birth compared to teenagers from lower income households. The results from this study showed that socio-economic variables play a vital role in reducing teenage childbearing.

This study confirms the findings that teenagers from rural areas gave birth more than teenagers from urban areas. This is in line with the literature which showed that, in many rural areas teenagers marry very young and many of them give birth out of wedlock which normally results in marriage (McGrath *et al*, 2009). Furthermore, rural teenagers are less likely to be using contraceptives and often have no access to abortion services. Majority of teenagers who gave birth resided in rural areas. As a result, teenagers residing in rural areas were found to have higher probabilities of having a first birth compared to urban teenagers. This confirmed the findings from a study conducted in Zimbabwe where it was argued that many family planning programs are situated in urban areas as a result teenagers residing in rural areas are at a higher risk of giving birth as they are deprived of contraception services (Thomas and Maluccio, 1995). Similar results were found in Finland where highest teenage fertility rates were reported in remote areas of the country (Kosunen *et al*, 2002). Teenagers from urbanised provinces for example Harare and Bulawayo were found to have lower probabilities of giving birth compared to less urbanised provinces namely Matebeleland South, Matebeleland North, Midlands, Mashonaland West and Mashonaland East.

6.3. Limitations of the study

To improve the results on contraceptive use, it is important to have data on the timing of contraception usage relative to childbearing. This study did not have data on the timing of contraceptive usage. As such, it is vital for future studies to consider timing of contraceptive usage relative to childbearing among teenage mothers in order to make substantial conclusions on the effect of contraception on teenage fertility.

6.4. Recommendations of the study

The results showed that marital status is the leading cause of increased fertility among teenagers in Zimbabwe with married teenagers giving birth more than never married teenagers. From these results, it is important for the government to implement free universal education at primary level so that parents will focus on saving for higher education. This will allow teenagers who are from poor backgrounds to spend more years in school thereby postponing marriage which will ultimately lead to reduced teenage fertility. As a result, policies and programs towards decreasing fertility during teenage years should be directed to promoting female education beyond the primary level.

It has been indicated that teenagers who reported using contraception gave birth more than teenagers who never used contraception. As indicated above, these findings could be attributed to lack of ability to ascertain timing of contraceptive use relative to childbearing. As such, it is important to have contraceptive use campaigns which are meant to educate both never married and married teenagers. In addition, parents need to be educated on the importance of sex education in schools, such that it can be reintroduced without facing any criticism and rejection. Furthermore, a variety of choices need to be provided freely to teenagers without being stigmatised. It has been highlighted that only married teenagers or those who are accompanied by their parents are allowed to access contraception in Zimbabwe. This needs to be reviewed because it is vital for teenagers to access contraception services before marriage and childbearing. Rapid decline in teenage fertility can be experienced in Zimbabwe if there are no restrictions on the access of never married teenagers to contraception and also if sexually active teenagers are encouraged to practice contraception.

This study helps in providing information on teenage fertility in Zimbabwe such that corrective measures can be taken when moulding policies directed towards curbing teenage fertility.

6.5. Conclusion of the study

Teenage fertility has been reported to be one of the major population concerns worldwide. Although fertility has been declining in Zimbabwe, teenage fertility was never stable since 1988 and a sharp increase from 99 births per 1000 teenagers in 2005 to 115 births per 1000 teenagers in 2011 was observed. This study made use of Bongaarts (1978; 1982) framework as its theoretical framework which is comprised of the proximate determinants through which

socio-economic, cultural and environmental variables affect fertility. To investigate the determinants which are age, marital status, contraceptive use, abortion, age at first sex, educational attainment, wealth index, place of residence and province; this study utilized multiple logistic regression models, Kaplan Meier Survival Estimator and Cox Proportional Hazard models. Multiple logistic regression models were used to examine the relationship between determinants of teenage fertility and teenage childbearing that is whether the teenager has a child or not. Kaplan Meier Survival estimator and Cox Proportional Hazard model were used to investigate the relationship between the timing variable that is the age at which a teenager had a first child and teenage fertility. These models were used to analyse the relationship and effects of proximate determinants on teenage childbearing. Through the use of these models, four plausible proximate determinants were found to explain teenage fertility rate in Zimbabwe. These are marital status, contraceptive usage, abortion and age at first sex.

The results from this study has shown that marital status is the leading proximate determinant which is contributing more to teenage childbearing, followed by contraceptive use and age at first sex. In consistent with the theoretical framework of this study, abortion is the only proximate determinant which was found to have inhibiting effects on teenage childbearing in all the models. In addition, it was found that education is a vital socio-economic variable which inhibits teenage fertility. Teenagers from middle and higher income households were found to have lower probabilities of giving birth compared to teenagers from low income households. Similarly, teenagers who resided in rural areas were more likely to have given birth than their urban counterparts. From the findings of this study it was suggested that the government need to formulate strategies for example free primary education, which encourage teenagers to spend more years in school thereby postponing marriage and reducing teenage childbearing. In addition, it was suggested that restrictions on accessing contraceptives during teenage years need to be revised in order to encourage both never married and married teenagers to consistently use contraceptives before their first child.

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